

AVIATION WEEK

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NOV. 8, 1954

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AVIATION WEEK, November 8, 1954

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Domestic

Cessna XPY-VTO fighter made its first maneuvers to increase its flight after vertical takeoff last week at Brown NAS near San Diego. Capt. Cessna test pilot J. F. "Stech" Coleman went to horizontal flight at about 175 ft. altitude and made several high-speed passes above the field. He then launched the XPY-1 and backed it down to a vertical fall landing on its tail. Flight totaled 21 min., ranked first test since XPY-1 has been flown through complete cycle times verified to horizontal and when it was vertical.

But YB-16, Pseudo Helicopter Corp.'s 48-passenger, two-engine cockpit, will be converted from piston to turbine power under a new USAF contract. The engines will be of higher power than the Allison turbines in the YB-16A (AVIATION WEEK Nov. 24 p. 38).

Rocket-powered 10-12 will be put through Army field evaluation tests under a new order for an additional number of Heller Helicopters' two-place 300 lb. capacity Army, Navy and Marines are scheduled to take delivery by the end of this year as the first evaluation quantity ordered from the Palo Alto, Calif., company.

Safety work of 12 months without a field accident was completed Oct. 30 by scheduled U. S. international airlines. An Aviation Week reports. During this period, the big lines flew 2,673,000 passenger miles with 3.6 billion in cargo.

Continental Air Lines will equip its fleet with wireless C-band radar for status warning, reports to complete installations by next fall. C. is the only domestic air carrier to announce plans for Bortec radar use, following the lead of United Air Lines. On international routes, Progress will use C-band radar as its new DCS.

Red Aircraft Corp.'s Helicopter Division has secured TRAN contract to inspect and repair 70 Army H175 copiers at Ft. Worth between now and next June.

Financial

Lockheed Aircraft Corp., Burbank, Calif., will increase its fourth quarter dividend from 10 to 50 cents and pay an extra 50 cents Dec. 31 to stockholders of record Nov. 19. A 5% stock dividend, one share for each 20 shares, will be paid Jan. 24 to holders of record



First View of Navy FJ-4 Fury Jet Fighter

Powered by a Wright J65 W-4 in height of 7,000 ft. third, the first of two prototype North American Aviation FJ-4 Fury jets took its maiden flight at Fort Belvoir, Okla., Oct. 29. Navy's seventh worldwide number of the aircraft has been delivered during 1955 and 1956. Later in NAA Oklahoma Division's Fury series, the FJ-4 features numerous improvements over earlier models—such as new, thinner tail surfaces, noticeably dropped thrusting leading edges and exhaust tips, new leading gear up and retract "type" from the cockpit to dorsal fin.

Nov. 30. The company estimates earnings for the third quarter of 1954 at \$6 million, compared with \$6,650,000 for the second quarter and \$4,880,000 for the first. Sales for the first nine months are expected to total more than \$100 million. Ending Sept. 30 \$1,011,861,900.

McDonnell Aircraft Corp., St. Louis, had net earnings of \$63,811 for the first quarter of April 1955, dropping from \$1,167,749 for the first three months of last year. Sales totaled \$37,940,261, compared with \$16,679,961 Company's ending Sept. 30 \$413,799,410.

Pseudo Helicopter Corp., Morton, Ill., has declared a 10% stock dividend payable Nov. 22 on all shares of record Nov. 8.

R-R for AA?

C. R. Smith, president of American Airlines, and AA's senior vice president James W. J. Shogan were reported back in England last week in connection with merger.

High in transport industry interest report South a working exclusive rights to a new and powerful Rolls-Royce turbojet engine. American's president recently has been probing U. S. aircraft manufacturers to come up with suitable turbojet proposals (AVIATION WEEK Nov. 1 p. 9).

Smith is said to be interested in putting British turbojets on a new fleet of Douglas DC-7Cs.

East American Airlines, San Diego, will use a single 10-hour quarterly dividend plan as early as 10 cents Dec. 10 to stockholders of record Nov. 19.

International

Spain-Australia Airlines' first Vickers Viscount arrived and landed last week seconds after takeoff on a training flight from Australia. August near Melbourne: taking their TAA pilots. Reports from Melbourne and the transport wing to the right after it became airborne and struck a tree.

Peace of Brazil has not received its order for four B-26C Superfortresses and option on two B-26C, reports the SoCal. In Brazil Aircraft Construction 3044, was the airline before was built in the jet transport "line" that it has learned the come of the accident in the Cessna 1 and what steps are being taken... to expose future aircraft of this type.

Vickers Viscount 700D has been ordered by Hong Kong Airways, a scheduled for delivery in late 1955. Total value of the contract, including option and as option on a second Viscount approximately \$1,813,100.

Southwest Airlines System's planned transport service has received speedy approval from Civil Aeronautics Board and President Eisenhower. SAS' three-year, temporary license as carrier certificate permits operations between terminal points Los Angeles and San Francisco, Calif., Capitanes and a return route stop at Cleveland.

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- 9 FUEL IMMERSION
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- 11 OVERHEATING
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November 8, 1954

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8—(top) TWA; (center) Standard Air-
craft; 10—(top) Lockheed; 11—(center) TWA;
12—(top) TWA; 13—(center) TWA; 14—(center) TWA;
15—(center) TWA; 16—(center) TWA; 17—(center) TWA;
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CUTLASS with CAMERA, designed F7U SE, 35 in. longer than fighter version and carries 191 fuel tanks for night photography in the top of its twin jet engines. The Cutlass recently carries multiple 25-mm. cannon above cockpit.

U. S. Shows New Weapons in Air Arsenal



AUTOMATIC ROCKET GUNS in other side of Northrop F-100 Scorpion test bed's nose are product of Amman Research Foundation. Developed under Army Ordnance contract, they are designated F1100 Intractors. Units are tested on F-100 workshop in photo at right.



TWIN DELIVERY of early warning role-equipped Super Constellation to Air Force (foreground) and Navy was made recently by Lockheed. Each plane carries as tons of weapon equipment. Wingtip tanks hold 1,200 gal. of extra fuel.



stars* in their orbit...

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*Examples of the many standard and specially designed Marmar products...from top left:

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WHO'S WHERE

In the Front Office

In Mike T. Cole, former president and general manager of Cessna, a new president of Raytheon Co. has been named. Cole, 48, is a former president of Raytheon Co. and has been with the company since 1968. He is a former president of Raytheon Co. and has been with the company since 1968. He is a former president of Raytheon Co. and has been with the company since 1968.

Robert L. Hill, engineering manager, has been named president of Raytheon Co. Hill, 48, is a former president of Raytheon Co. and has been with the company since 1968. He is a former president of Raytheon Co. and has been with the company since 1968.

Changes

Arthur E. Hanson, former vice president of Raytheon Co., has been named president of Raytheon Co. Hanson, 48, is a former president of Raytheon Co. and has been with the company since 1968. He is a former president of Raytheon Co. and has been with the company since 1968.

Robert W. Bowman is now chief industrial engineer for Boeing Corp., Seattle. Bob Bowman, 48, is a former president of Raytheon Co. and has been with the company since 1968. He is a former president of Raytheon Co. and has been with the company since 1968.

Honors and Elections

Capt. R. J. G. Bartlett of Britain's Royal Air Force is a new president of the Federation of Aerospace Industries and C. S. Bartlett, 48, is a former president of Raytheon Co. and has been with the company since 1968. He is a former president of Raytheon Co. and has been with the company since 1968.

INDUSTRY OBSERVER

USAF investigators believe George Wold, North American Aerospace test pilot, was fatally injured before he left the cockpit of his deteriorating F-100 Super Sabre. He apparently was struck by pieces of the plane as it broke up. Air Force investigators insist he did not use the ejection seat but was pulled out of the cockpit with his chute opened by the operators. Cause of the accident, which occurred during pursuit from a responsive dive, has not been determined.

Lockheed's turboprop YC-130 recently made an emergency landing at Philadelphia with two of its Allison T56 turboprops inoperative. Both engines of No. 1 and No. 2 engines followed shortening fuel passages, issued to faulty fuel filter. The turboprop transport has made more than seven flights since then without further trouble. Test pilots report stall characteristics are excellent, an important factor in view of deterioration now planned for the C-130.

An Air Force has been testing a specially modified Lockheed ZV-5 Nighthawk at Eglin AFB. USAF is interested in the short-field performance of the Nighthawk, a Navy jet fighter. Lockheed engineering test pilot Stan Belts and an Air Force pilot narrowly escaped injury when the aircraft crashed and burst at Eglin recently.

Kollsman is continuing its penetration of the American aircraft engine market with the sale of Braniff Aero turboprops to USAF for use in the Ryan delta-wing VTO project.

North American F-100C Super Sabre will be equipped for aerial refueling operations.

C. R. Smith has been named (Aviation Week Nov. 1, p. 31) that he has been conferring with Lockheed, Douglas and Convair on development of a turboprop transport for American Airlines as a replacement for its Convair 440. Smith and American is preparing detailed specifications for its new turboprop transport requirements but that generally it must carry 30 or more passengers, have four engines, cruise between 325 and 350 mph and operate from economically built, general purpose airports. Smith wants to put this transport in service by 1968.

Light helicopters for target spotting and reconnaissance work may be armed with rocket packs for defense against ground fire, currently the most effective opposition encountered by the helicopter.

Two solutions to the problem of reduced bomb load up in the backbay of a high-speed plane by aerodynamic forces is a spoiler, deflecting like a dive brake ahead of the backbay. Douglas El Segundo is one manufacturer trying such a solution on a modified A1D Skyraider.

The American World Airways Douglas DC-7C on order will be placed almost entirely in high-density seating, lowest class service. The carrier's fleet of Boeing Stratocruisers held in the best airplane for passenger comfort, will continue to handle greatest portion of first-class service, since the installation of improved turbo-propellers and extra wing tanks is expected to enable FAA to operate trans-Atlantic nonstop Stratocruiser service about 57% of the time.

Radio transponder beacon program is expected to get a high priority in Civil Aeronautics Administration as a result of recent Air Transport Alert letter warning airline support. ATA suggests five East Coast airports be equipped with military ground interrogators in the next year to facilitate winter holiday operations. Meanwhile, Air Navigation Development Board has made plans for electronic transponder beacons service test facility, two on seven Lake County Airfield DC-10. TCA operates into Indianapolis and Dayton where ground interrogators already are installed.

AVIATION SPACE, November 8, 1984

009 for 12" turboprops and R390 piston engines.

Missiles

- **Sperry Gyroscope Co.**, \$123,092 for missile development.
- **Raptheon, Inc.**, \$2,743,045 for space missile.

Electronics

- **Radio Corp. of America**, \$673,680 for engineers services.
- **Sylvania Corp.**, \$1,685,635 for electronic equipment.
- **Sperry Gyroscope**, \$1,517,776 for ground support equipment.
- **Bell Aircraft Corp.**, \$169,992 for audio frequency roles.
- **Radson Corp.**, \$372,878 for target drive electronics.
- **Magnarac**, \$111,685 for electronic research and development.
- **Teco Instrument Co.**, \$127,839 for electronic equipment.
- **Alconet Radio Corp.**, \$2,499,467 for electronic equipment.
- **Philco Corp.**, \$983,093 for personal engineering services.
- **International Telephone & Telegraph Corp.**, \$4,747,673 for electronic equipment.
- **Western Electronic Co.**, \$1,310,600 for minor research.
- **Central Caucasian Industries Co.**, \$561,330 for electronic equipment.

Helicopters

- **Sikorsky Aircraft**, \$57,511,912 included.
- **UH-3A** is best engine Marine assault helicopter, \$48,202,354.
- **F88H** ASW helicopter, \$6,615,986.
- **HO4SE** rescue, \$195,412.
- **Eldec Helicopters, Inc.**, \$522,610 for YH-32 rotor.

Accessories

- **Blounts Standard**, \$5,814,905, including \$1 million for its new assembly in Irvine, Calif.
- **Garrett Corp.**, \$1,124,246 for components.
- **Wallace Aviation Corp.**, \$266,771 for research and development on gas turbine compressors and turbine blades.
- **McKinnon-Terry Corp.**, \$764,679 for outposts.
- **Judson & Church Co.**, \$1,077,603 for outposts.
- **Edgemoor Division of Borealis American Corp.**, \$4,651,182 for aircraft instruments.
- **Heller Carbinette Corp.**, \$341,071 for plant facility expansion.
- **Greiner Engineering Corp.**, \$125,356 for research and development.

Other U.S.-F contracts previously an-

nounced, but not detailed in dollar volume are:

- **Boeing Aerospace Co.**, \$15 million for test aircraft at KC-135 jet order production.
- **Lockheed Aircraft Corp.**, \$31 million for test aircraft of F-104 production.
- **Boeing Aircraft Co.**, \$4,301,492 for 200 L-34 Slicker bombers.

Mach 2 Liner

- **Lockheed designs new supersonic jet transport.**
- **Aircraft would use "wing tricks," look like fighter.**

Berkeley, Calif.—Lockheed Aircraft Corp.'s first supersonic jet transport may come at Mach 2, says personnel engineering. Hal L. Hubbard told AVIATION WEEK in an exclusive interview.

Hubbard said the company has a design for a Mach 2 supersonic jet-powered transport with wings to make it run between Glasgow and Los Angeles. Sea-level costs are estimated at about twice the contemporary level.

The Lockheed executive also predicted a large customer demand for what he called a "nice, new, clean, Veejet"—a modern helicopter transport with a 60-passenger capacity as the result of Capital Airlines' purchase of Western Veejets from England (Aviation Week Sept. 13, p. 55).

Planned for Speed—The supersonic transport would look like a fighter, Hubbard reported. It would use bleed-airjet control for long reduction and some "wing tricks," he said, because "you've got to do away with the wings." (This might imply partially or fully lifting, with the possible complication of attaching sections of same type for additional lift during the landing and takeoff.)

Company plans for subsonic jet transports depend on the opening decision in the USAF competition between Hubbard and Lockheed's own design for the competition at the end of August, ready for shipment, the material weighed in at 1,285 lb.

The company believes the size of the prospective turbine engine makes splitting it between two firms for two airplanes, and Lockheed is confident that its design will be one of the two.

► **Chrysler Tech. Partners**—The three firms will, with Lockheed, make a "dash transport," and Hubbard "We were lucky that the tender requirements worked out as we expected so we could test into a contract."

A "contractual jet transport" had instead that design would be cheaper

to operate than a piston-engined airplane, in a cost per seat-mile. But it would be a big airplane, bigger than the Boeing 707.

"But we have to face reality," Hubbard added. "We're in a tough business, and one of our jobs is to look at all the alternatives." If we were to lose the tender competition, of course, I don't think we will then the next step would probably be a request for transport. We've got to make that hard at a jump recently to keep ahead of the field."

► **Updated Veejet**—Out of all the engine, airframe and auxiliary thinking about equipment replacement, Hubbard says a customer demand for an updated Veejet. "The airlines have been talking around this kind of an airplane for two years," he said, "and the Capital purchase has brought it up stronger than ever."

Hubbard pointed out there is no U.S. helicopter (except models to be in as the powerplant for a four-engine 60-passenger transport, and there is not likely to be because of the lack of military interest in such an engine.

But he believes there is a market of about 350 planes—and this may be a conservative number, he noted. This would mean the sale of 2,000 engines and 1,000 rotors.

"That kind of a market might stir up some interest on the part of our engine manufacturers," Hubbard commented.

Avionics Show Draws Big Crowd of 7,000

Los Angeles—More than 200 vendors displayed equipment at the Avionics Electrical Society's 11th annual meeting here last week.

A crowd of 7,000 gathered to see the latest in avionics equipment exhibited by large manufacturers such as Westinghouse Electric Corp., General Electric Co., and Minneapolis-Honeywell Regulator Co. and smaller firms.

AES president Charles S. McKinnon said he believed it was "by far the largest and best show the society has sponsored."

Britain Rejuggles Cabinet Air Posts

Control of British aviation has changed hands in a reshuffling of top cabinet posts, moving Harold Macmillan and to Winston Churchill, under a shadow transport," and Hubbard "We were lucky that the tender requirements worked out as we expected so we could test into a contract."

A "contractual jet transport" had instead that design would be cheaper

Two New Bells

- **Three- and four-placers are put on the market.**
- **New survey shows need for improved models.**

St. Worth—Bell Aircraft Corp. is not quibbling delicate pieces, but it is producing commercial sale of two new helicopters and says they will be ready for market only next year.

Newest addition to the Bell line is the 47H, a streamlined version of the company's widely used Model 47 utility helicopter. Prospective customers have not been shown a piece yet, but an estimated price for the three-place helicopter puts it at the \$42,500 range.

Bell also is demonstrating a four place helicopter, the 47G-1 (Aviation Week Sept. 13, p. 17). Again, no price has been set, but specifications place the price at about \$47,500.

► **Safety**—With more than 1,000 of the present aircraft already produced, Bell says are of structural design components in the 47H means information, safety and low maintenance costs. Time between major overhauls will be 600 hr.

Useful load for the 47H is given as 470 lb. It carries 35 gallons of fuel, has a range of more than 230 mi at a speed of about 90 mph. An optional 200-hp. Franklin engine will be installed in production models.

► **Sales**—Bell's in a recent market survey conducted by Bell on a tour with the Model 47G, basic utility design, sales personnel uncovered wide interest in the aircraft but found it hampered by low speed, engine appearance and lack of real passenger comfort.

The 47H is Bell's first serious effort to overcome these objections. The fuselage has been closed in with metal and painted white. A baggage compartment has been installed, along with a glass seat. Cabin has been enlarged to permit wider seats and installation added to reduce the noise level. For these improvements found in the 47H include sale of 100-hp. engine construction for some other and door assemblies, providing greater strength and rigidity than sheet metal and requiring less maintenance.

Streamlining of the fuselage has increased speed about 20%, according to Joe Marston, pilot and executive director of contracts. He says placing controls and switches on a console at the pilot's left adds to safety and ease of operation and need not be.

► **Executive Copies**—The company says the executive transport will possess good earline, although it also can be equipped for utility purposes and work over water.



STREAMLINING of four-blade 47G gave new 47H (above) about 20% higher speed and propellerwise reduction in fuel consumption. New redesigning CAA certification trials, the aircraft's ground configuration is similar to the 47G (Aviation Week Sept. 13, p. 17).



ENGINE is improved 200-hp. Franklin. Its available power of maintenance. Flight tests between overhauled a 600 hr.



BAGGAGE AREA is large enough to allow passengers to take ample luggage. Also at 200 lb. seat and a three-door exit.



INSTRUMENT CONSOLE is located at pilot's left to give him and passengers ample room in the 47H's enlarged 60-in. wide, side-by-side cabin. Seats are automobile type.

for the executive transport will possess good earline, although it also can be equipped for utility purposes and work over water.

It was given its first public showing last week in Dallas at the annual meeting of the National Business Aircraft Assn. (see p. 16).

232, *Cometone* Super Widgeon amphibious, Rockcraft C50 Twin-Bonanza and Super 18, the Aero Commander 560, Piper Apache, Sky Twin Navion and Lons Luster.

■ **Airline Cooperation**—Futrell speaks at the convention were Robert Rasmussen, vice president of Eastern Air Lines, and Stephen F. Collins, executive vice-president of the American Legion.

Rasmussen, who spoke at NAA's annual awards luncheon, urged the corporation to pay heed to the nation's airlines in the solution of several problems and to adhere to present airline rules from restrictive laws.

The former congressman and once two-time president of Air Transport Association told the delegates that the use of aircraft for business purposes largely is responsible for the current trend toward deregulation of American industry. This movement, he said, is good for the country's economy, while there being no reason to remove plane pilots and mechanics in case of war and provides some stability for the aircraft industry.

■ **Domestic National Policy**—NAA's figures show that 32,393 aircraft are owned by business firms and that nearly 3,600 of these are multi-engine planes. This is substantially more than the 1,300 operated by the airlines, although the airlines usually fly a greater number of passengers miles.

Collins, addressing the association's annual banquet and luncheon held at NAA to support the American Legion, stressed the need for a new law giving "on the spot" method of getting message to language as follows:

■ **Top Honors**—NAA's highest honor, the 1974 Special Achievement Award, was given to Donald M. Stuart, director of CMA's Technical Development and Evaluation Center at Indianapolis.

A former pilot, chief pilot for last part in the development of six wings like six, lighting, airports, communication, radio and electronic equipment and air traffic control devices, was presented by Cole H. Moore, retiring board chairman.

Recognized directors William H. Reider, Republic Steel Corp., Cleveland; Joseph H. Burns, Fuller Brush Co., Hartford, Conn.; Walter C. Payne, Arrow Steel Corp., Middleburgh, Ohio; and Delta W. Reister, Aeta Turboprops, Inc., Oklahoma City.

RAE Proposes New Tests at Comet Inquiry

London—Sir Arnold Hall, director of Royal Aircraft Establishment, last week told the Comet court of inquiry what new pre-acceptance testing he believes should be done on British Comet aircraft.

■ **Identify the most likely fatigue-prone parts** by among other methods, doing RAE tank tests on an entire aircraft.

■ **Test to destruction** by degrading loads on an crash of production specimens must take to fail, then take the 20,000-lb and divide this figure by three.

Result is conservative safe life. After one test to destruction, spare the part to guarantee it will not fail at the same location under further testing, then test it to destruction again to get the No. 2 failure point.

RAE experimental evidence is that half a dozen specimens are all that are needed to test for almost conclusive results.

This procedure would permit design changes to be made and/or parts to be replaced schedule for specified aircraft determined ahead of time.

■ **Material Stress**—The fact that stress was in the Comet 1 was again in part confirmed in itself Sir Arnold told the inquiry.

RAE investigations have shown that maximum stress on a stress link in a jet model stress is little different than the maximum stress on a spare hole with rounded corner, like those of the Comet 1.

The point not gone into, however, was the difference in stresses needed properly to distribute the load away from cutouts in complex structures such as an aircraft fuselage. Stress comes from the structure, not the stress comes from the cutout, was an inference given in detail on this, but Sir Arnold indicated it was an important factor.

■ **Manufacturing**—Comet-De Havilland Aircraft Co. is concerned at the possibility being given to manufacturing errors.

Sir Arnold said that if he had known about the stress after the Elbo crash last Jan. 16, he would not have assumed that the Comet 1 was stress-free prior to the Nappes accident in April when the cracked parts had been replaced.

On G-ALYP, the Elbo Comet, approximately 70% of which was borrowed from the serial, there were four of these cracks around the rear ADF window, three in the reinforcing plate and one on the skin under the plate. Seven cracks around this window also were 3.24 in. from the edge of the plate instead of 0.1 in., as apparently called for in design drawings. This is outside normally accepted permissible tolerance.

There has been an indication, however, that this or cracks per se are considered to the Elbo landing.

Other witnesses before the court last week were representatives of the Air Registration Board and De Havilland.

Explosion Suppressor Protects U.S. Planes

A British-designed device for snuffing out aircraft explosions in the milliseconds between ignition of fuel-air mixtures and actual blowing of living fuelled air products outside of one Air Force and two Navy planes.

The explosion suppressor system, originally developed by British's Royal Aircraft Establishment and now more featured in the U.S. by Scansonic Aerospace, Inc., at Tarrytown, N.Y., within a combustion chamber, fuel throughout aircraft fuel tanks immediately after ignition. (Aerospace Week June 11, 1974, p. 49).

Scansonic identifies the three planes that now use the device only as "advised combat types."

■ **Cock Pit Tests**—The new system is being used in experimental work to light fire in engine nacelles, especially guided missile powerplants. And some tests are under way to combat crash fire with explosion suppression.

These two possible applications of the concept first were proposed by RAE's W. G. Glenhams and A. M. MacLennan, who carried out original work on the system in 1949.

Glenhams was the rate of travel of the combustion products outside the inhibitor from its detector is approx. 300 ft/sec. faster than the speed of burning hydrocarbons. "We think this high rate of reaction makes it feasible to achieve protection of aircraft in combat crash fire by blanketing engine exhaust system and for flooding compartments into which fuel air mixtures have leaked or leaked," he said, and to provide fire in engine nacelles in which a high rate of air flow makes it impossible to maintain a sufficiently high concentration of extinguishing with the usual permanent built-in spray system.

■ **Wet Blanket**—Described as a "wet blanket for aerial blowups," the explosion suppressor system contains three basic elements.

■ **Sensing element** designed to detect a building explosion before its cracks destroy a proportion.

■ **Suppression fluid** expelled that obscures when a moment from the detector closes, providing a mist that blankets the explosion.

Scansonic uses such systems to be applied to meet the requirements of individual aircraft and can be installed in particular against single or multiple explosions. The system uses two types of detectors, "vandal" or "permanent" type.

Granted a U.S. patent last week, Scansonic holds sole manufacturing rights in America under a license from the Convair Manufacturing Co., Ltd., of England.

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How AMC Terminates Contracts

Cutoff process speeded by using new procedures that make possible salvaging of much surplus material.

By Charles Wirtz

Dorton—Contract terminations now are speeding through Air Material Command machinery with fewer delays than at any time since the end of World War II.

In addition, AMC is salvaging a second amount of the serviceable property and material left on hand in contractors' plants where terminations have been ordered.

► **50% Sold**—According to Col. William H. Harrell, chief of the Acquisition Division of the Directorate of Procurement and Production, the Air Force economy drive for the past 12 months has seen 50% of the inventory at plants of terminated contractors salvaged for government use. Only about 50% is being sold at the present time at auction.

"The contractor now is getting better service and USAF is saving more money than any time in the past," Col. Harrell told *Airways Week*. "I believe we are just the peak of our load in contract terminations, but this effort has become more efficient with experience and the consolidation of rules, regulations and procedures into workable forms."

"As for economy, the amount of discarded surplus sold by AMC probably is lower today than it has been in the past 10 years."

► **Error to Needs**—Most contract terminations have been completed at delivery or made "for the convenience of the government," Col. Harrell said.

This commitment is not a matter of whim, he adds, pointing out a USAF directive that a halt in production is necessary "when the surplus in inventory being produced have become excess to requirements."

Conditions leading to this situation include:

- A better time has been developed through research.
- Requirements have changed due to different world conditions.
- Contract experience dictates a change in equipment types or quantities.
- Congressional appropriations force a change in program.
- An adequate and safe stock level has been reached.

Col. Harrell put additional emphasis on the contract factor. The practice of terminating in the long run is to stop spending money.

He said this is the reason AMC contracts include a provision giving the contractor the right to terminate a

contract. Material, manpower and facilities cannot be wasted.

► **Headquarters Decision**—In the case of aircraft, the decision to terminate a contract is made by Headquarters, USAF. The aircraft is left quickly by the supplier of all the equipment that goes into the weapon system, both government-furnished and contractor-furnished. Most of these items also are terminated at once.

In the case of supplies other than aircraft, the office that requested the procurement request makes the termination decision. Col. Harrell cited engines as an example. If the Supply Division originated the procurement request, it also would request the termination and initial action is taken by the Procurement Division before it is issued a "termination authority."

The document is passed to Col. Harrell giving the reason for the cutoff—whether it is partial or complete and the effective date. The Procurement Division acts under terms of the contract, which provides for settlement by negotiation or by specific terms that

have been included as part of the original agreement.

► **Fast Decision**—Most important for the prime contractor is his responsibility to notify subcontractors at once that their product no longer is needed.

"We recognize," Col. Harrell said, "that nobody can press a button and stop work on a moment's notice, but the government does expect contractors and subcontractors to act quickly and halt production as quickly as possible."

Settlement of a terminated contract is handled by this team:

- **Termination contracting office**, responsible for negotiating settlement and all final demand for the government.
- **Plant clearance office**, issues and advises on property matters, instructs contractors in preparation of termination inventory schedules and how to use or dispose of property.
- **Working, visits and advises on costs**, drafts written report on contractor's settlement proposal.
- **Legal office**.

Col. Harrell says a contractor who has received a termination notice should act on delay making a conference with the people AMC represents. "This is essential to provide for interim financing and the handling of either end inventories that will come from subcontractors."

For this conference, the contractor can appoint his own agents who are experienced at preparing for any reasonable costs for the period of time allowed. This is confined to preparation of the settlement proposal, handling inventory and selling subcontractor claims. It does not cover contractors' expense in acquisition of terminated material.

► **Approval Waiver**—Terminated subcontractors need be terminated by the contractor or subcontractor—he has made them, subject to approval of the contract termination office. In some cases, the request for termination of the amount of the contract does not exceed \$100,000.

"It is not at all unusual in a normal termination case for the prime contractor to have several hundred subcon-

tractors who are terminated at once."

The accompanying article explains how and why AMC terminates contracts.

Edged in Black

There is a firm slogan used by Air Material Command that means a lot of anything when it comes to the office of an Air Force contractor.

"You are heavily notified," the slogan says. "Your contract is terminated in its entirety for the convenience of the government—office immediately."

The blunt truth is that any contractor, whether he makes fighter planes or test pencils, could receive such a message from Wright-Patterson AFB. It is equally true that a large number of contractors would be not only shocked, but baffled, by the telegram. They need to know:

- Why was the order issued?
- How does it get paid to the work and inventory on hand?
- How and where do they present a claim for settlement?

Airman Wick, in an Aug. 16 special issue on Air Material Command, worked industry with a one-on-one handbook on how the Air Force buys weapon systems and all the supporting equipment—a purchasing program that under the biggest business in the world.

The accompanying article explains how and why AMC terminates contracts.

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Settling Contracts

Settlement of a terminated AMC contract is governed by provisions of the contract.

For authority, procedures and policies, the following provisions are referred to Section 5 of the Armed Forces Procurement Regulation and Air Force Manual 704 (All Force Procurement Procedures). These documents give:

- Force for preparing and submitting a termination claim.
- Supporting documents required, such as inventory schedules and accounting information.
- Cost principles for evaluating claims to the termination claim.
- Guidelines for using or disposing of inventory.

As guides in the settlement of a terminated fixed-price contract, the provisions are for cost principles set forth in Part 4 of AFPR, Section 5.

In the event of a formula settlement, settlement of such principles are mandatory. In the case of a cost-plus contract, cost reimbursement or construction contract, the applicable cost provisions of AFPR Section 15 that have been incorporated in the contract are applied.

traction in several ways," Col. Harell says. "The use of the percentage delegation of authority up to \$10,000 permits more expeditious handling of the subcontract settlements by depressing with the economy of government approval."

"We are extremely aware of the fact that the subcontract structure constitutes a most important and integral and important part of the procurement of the end item. Unless the terminated subcontract is settled fairly and expeditiously, the financial stability of the subcontractor could be severely affected."

"Failure to handle such matters properly could upset the economy of the community where a plant is located. The Air Force makes it part of our business to see to it that such cases are properly settled."

► **Procedure.** While AMC retains the right to discontinue a terminated subcontractor's claim, there are regulations to expedite the procedure.

• The subcontractor's settlement must be settled in the same way as the prime contractor's claim.

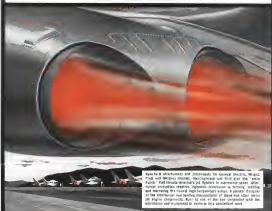
• The accounting review must be done by the prime contractor or the subcontractor's subcontractor.

• Where the amount exceeds \$25,000, the accounting is reviewed by Air Force auditor.

• If necessary, AMC can order a further accounting review.

"When it comes to actual negotia-

RYAN AFTERBURNERS BLAST U.S. JETS AHEAD



Even to 8 afterburners and continues to power the jet, Wright and Allison (above). Wright's and Allison's "hot" turbofan "hot" turbofan (above) jet engine in service since afterburner enables engines ingested air to be heated, and making the most high temperature jet. A power turbine of the afterburner and turbo compressor of the jet engine (above). Ryan is one of the few contractors with the experience and equipment to produce this specialized work.

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tion, usually there is a sense of confusion pending completion of the prime contractor's work and disposition of the property involved. If an agreement is reached, the transaction involving others renders a finding and the contractor has 30 days to make an appeal to the Armed Services Board of Contract Appeals.

► **Industry Assistance**—"We try to get termination over by negotiation whenever possible," Col. Harrell said. "The same basic business philosophy that existed under the post termination regulations have been incorporated in Section 5 of the Armed Forces Procurement Regulation and the Davis procurement procedure. Industry has been successful in drafting these provisions and they moved them over during World War II."

"During the war some 27,000 years' contracts and branches of thousands of subcontracts were settled along the same lines."

► **AMC Scratching**—Close major head also growing out of contract termination is the disposal of inventory.

The contract, working with AMC's

plant clearance officer, has to meet and classify the material. Where nonreturnable is discarded, there must be an inventory schedule.

Whenever possible, items are diverted to other government projects or to the contractor's commercial business. Common material that can be used by the contractor will not be paid for by AMC in the settlement.

If property cannot be used by the contractor, a lot of it is sent to AMC for scoring to find out where the Defense Department or other federal agencies might be able to use the items.

► **Termination Time-flow**—long does it take to terminate a contract?

Generally, Col. Harrell said, it can be done within six months. Some take longer and if circumstances warrant, a partial payment may be made on the final settlement.

"The time it takes to settle a termination," he related and, "depends in many cases on the payments with which the contractor submits his settlement proposal and the supporting documents."

He emphasized at this point that a



French Test Latest Version of Baroudeur

First photos of the second prototype Sirene S.E.9000. Four-engine lightweight ground-attack jet shows the plane on its rocket-powered wheels daily (top view) and on its extended belly slide after a landing (lower photo). This plane has more in size than the horizontal stabilizer than the first prototype, in addition to a streamlined fuselage

at the junction of stabilizer and fuselage. The control, fuselage sections on the lower portion of the aft fuselage also are new, although a right view of the second S.E.9000 shows it without these sections. The Baroudeur is being studied for possible use as a stand-on ground support plane for the North Atlantic Treaty Organization.



This is a Lear engineer designing a new autopilot

ROSE HARVEY, R.A.E. (University of Michigan), is one of ten Lear engineers qualified and actively flying as jet pilots. But please note that these ten engineers are engaged primarily in the design, development, and perfecting of automatic flight control systems, using their jet piloting skills only as an engineering tool.

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profit or loss is allowed only on actual work performed and AMC does not make up for a company's own profit at any time because of termination of a contract.

In the substantial brackets, termination settlements must be submitted to a review board in the Air Material Agency's jurisdiction. If the amount is over \$100,000 another study is required by the Settlement Review Board at AMC headquarters.

In the event that the proposal fails to pass one of these tests, it is returned to the termination contracting officer for further negotiations to be held with the contractor.

Not all terminations, of course, are for the convenience of the government. AMC also has "deferrals."

When a contractor fails to deliver and cannot justify his failure, AMC will notify the firm at the airport. In this case there is a penalty. When USAF is forced to find another source, even almost invariably go up. The deferral contractor then faces an amendment, which can be appealed within 30 days to the Armed Services Board of Contract Appeals.

Defense Needs Small Business, Lewis Says

Small business efficiency, says Assistant Air Force Secretary Roger Lewis, is fundamental to the overall defense program.

He says these firms are essential to the Air Force mission, most necessary in the event of quick mobilization for an emergency and, more important, thus depend throughout the course of an unrelenting threat of attack on the U. S. mainland.

In an effort to enter new areas that a few large prime contractors have a monopoly on, USAF contracts, Lewis told today 200 small business representatives in New York recently that there is need for their further integration, rather than present vertical contracting policies.

He urges large contractors to intensify subcontracting to small firms.

Over years small business does a good job in that the owner has a low overhead, Lewis says, and adds:

"He doesn't have anybody taking things out to be maintained and he doesn't have men on the road all the time. In many cases, he does not know how to sell. He doesn't know where to go. He's generally in one business, but he's been running his plant."

"So it's important that the Air Force, while not doing his selling for him or growing him any special deals, sees that he gets a break at least as good as the man who has the high potential sales department."

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MIDGE is flying with Viper jet in place of lightweight Olympus that will power production Gnat. Bristol says lower control cables.

Folland Tailors Gnat to NATO Needs

By Robert Row

Humble, England—The usual concepts of aircraft design and manufacturing, as well as fighter tactics and political philosophy, are being considered in the first Gnat lightweight fighter now being built by Folland Aircraft Ltd. These concepts are precisely the product of Folland's managing director and lead designer, William R. W. Potts. They involve:

- **Design:** Concurrence of the lightweight design philosophy with the conviction that the designer's immediate task is to respond to any question of combat survival in the transient stage rather than simply placing at highest speeds.

- **Manufacturing:** Interceptor and fighter-bomber aircraft must be producible widely by semi-skilled manpower using general purpose machine tools, both of which are more readily available in NATO member nations than the highly skilled labor and expensive specialized machine tools now required for large, heavy fighters capable of maximum performance. The simple manufacturing techniques are also necessary for large quantity production using limited labor and financial resources and within the time limits imposed by the rate of

Western member's technical progress.

- **Fighter tactics:** Use of means of intercepting fighters for mutual interception of enemy bombers, in contrast to complex schemes on fewer, heavier and more complex all-weather fighters. The Gnat remains would carry only a base minimum of airborne radar and jet

fire primary target, produced from ground equipment similar to that given sub-sonic missiles. The lightweight aircraft would be used in the outer defense line. The big, heavy, complex two-seat all-weather fighters would form the inner defense to pick off the few bombers that survived the initial radar attack.

- **Political philosophy:** Large-scale production of lightweight high-performance interceptors and fighter-bombers offers an answer to both the military and economic challenges of Communism to the NATO countries. The military challenge, demonstrated by the Communists' ability to produce 18,000 MIG-15s, can only be parried by rapid performance aircraft that can be produced in greater numbers and at less time. The economic challenge of equipment and suitable national finances can be met partially by an aircraft production program that provides world war, but skilled and semi-skilled labor in NATO countries without straining their limited financial resources.

- **To Fly First:** Britain's first Gnat is scheduled to fly late next summer and make its public debut at the 1955 SNEC Fairbrough show. It will be joined by an early version of the Bristol Olympus axial turbojet produc-

ing 3,750 lb static thrust. This engine with the 1,640 lb-thrust Armstrong Siddeley Viper now powering the Folland Midge (Aviation Week Sept. 20, p. 11) has a less than the 4,500 lb thrust planned for the Olympus production version.

Key to the Gnat performance will be the Olympus engine delivering 4,500 lb thrust for an assumed engine weight of about 350 lb—more than five pounds of thrust for each pound of engine weight. The attractiveness of the Olympus for aircraft designers interested in the lightweight fighter problem is demonstrated by its choice by eight of the nine competitors in the current NATO campaign (Aviation Week Oct. 15, p. 16) and its specification in an alternate powerplant by the sixth.

The Gnat has been designed from the start around the Bristol lightweight engine. Originally called the Sabre and eventually to power a Bristol missile, the lightweight engine development program was cancelled by the British Ministry of Supply shortly after design of the Gnat began.

- **Private Financing:** Concern of Folland's determination to proceed with the Gnat project, Bristol's decision to remove their lightweight engine project and Britain's paying without any assistance from the Ministry of Supply, the Gnat-Olympus lightweight fighter project is one of the few examples, particularly in Britain, of a completely privately financed military aircraft project in which two firms are backing their technical conviction with their own money.

The Olympus, like the Gnat, a corporate many engineering design features in which unnecessary structural or equipment requirements have been eliminated to provide more performance. For example, it uses a complete loss of hydraulic system redundancy, the weight of three pumps of oil in that of a servicing system.

The first Olympus will come out in the 5,716-lb thrust rating of the Sabre engine, but production models will deliver slightly more than 4,500 lb thrust and Bristol has developed a simplified lightweight afterburner that weighs only 90 lb and will add about 40 lb thrust to the Olympus output at the Gnat's combat altitudes.

- **Engine:** The Olympus is an axial-flow engine with a seven-stage compressor and a single turbine. Its maximum diameter is about 31 in. and the Gnat fuselage was designed to wrap around the Olympus with a maximum diameter of 40 in.

Basic design philosophy behind the Olympus is that it was designed from the start as a fighter engine and not dependent solely on the requirements that make the bomber-type jet engine



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MIDGE down sides construction. There is only one flying (across) in entire phase.



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so heavy, complex and expensive. It has a relatively low 1-to-2 pressure ratio. This is in contrast to the 11-to-1 ratio of the big eight compressor interceptors now entering service.

Bristol is aiming at other applications of the Olympus in addition to the Gnat, including jet trainers, tankers and a "two-ton" engine for rocket-powered aircraft.

- **Mach 2.2 Speed:** With the following, the Gnat is designed to have a top speed of Mach 2.2 and the capability of making interceptions at 57,000 ft—an altitude well above the

normal operating altitudes of either the Boeing B-57 or the American B-66. Increasing engine power will boost the Gnat's rate of climb to enable it to get to 40,000 ft, is about half of the five minutes that will be required by the prototype. The Gnat will have about three hours endurance with a full load at combat altitudes carrying interception armament.

Normally the Gnat will be armed with two 30-mm Armstrong cannon each capable of firing 1,200 rounds per minute. Provisionals also have been made for carrying two or four missiles during its



FOLLAND BUILDS HUNTER TAILFINES at a subcontract to Hawker Aircraft



VINCH AND SEA YENCH WINGS on the line at Folland's assembly shop at Bideford.

mentally with performance equipment carried on the fuselage.

Quality Improvement—Petter designed the Gnat primarily as an interceptor but it currently is leading the pack in the NATO fighter league—competition (Aeronautics News Ops, 25, p. 16). For these duties it could carry a pair of 500-lb. bombs or rocket racks or 12 three-inch rockets. There is some question as to whether the late piston would have to be sacrificed from 160 to 150 gals. to carry the full fighter loadout.

Petter believes that despite the initial perceptions by many aircraft into speeds above Mach 1, the fighter aircraft will continue to perform in the transonic range for some years to come. Consequently he believes the designer's job will now be to improve the flying qualities (controllability and maneuverability) of fighter aircraft in this range to make them more effective combat instruments.

With small and lightweight transonic aircraft, Petter believes that military pilots will get back to flying their aircraft instead of having the aircraft fly themselves—climbing from British test pilots flying experimental prototypes even at high subsonic speeds.

► **Fast Production**—The Gnat will have an 85% thickness wing with 40 deg. sweep, two degrees dihedral and an aspect ratio of 4.3. All of these factors combined with pre-bent-in ribbed airfoils and all-flying, swept tail will make the Gnat highly maneuverable up to its speed limits, Petter believes. In fact, he questions whether the all-flying tail will really be necessary in high-speed control.

Another major factor in Gnat design is its simple and quick production techniques. It is designed specifically for production with the type of machine tools and equipment that already exists in European factories.

► **Single Engine**—Group Capt. Stewart

Tedder, Folland's military liaison man, recently surveyed more than a dozen European aircraft factories for their capabilities in Gnat production and reported that all of them could move swiftly into lightweight fighter production with their existing tools and skill level of their readily available labor force.

There is only one snag in the Gnat and it is a simple 11-ft. job that can be done tonight. On it, Petter has hung much of the Gnat. The landing gear is attached to it; it takes the rear wing connection and anchors the rest of the fuselage. Practically all of the rest of the Gnat's structure can be fabricated with the rubber-pad forming technique on hydraulic presses.

To further conserve factory space and allow better construction, Folland has developed vertical gips for the Gnat fuselage. As an example of the contrast between Gnat construction and conventional fighters, Folland cites the 910 zero hours required to build the G69 fighter. Gnat wing at the same effort required to build a standard RAF fighter's horizontal tail. Since Folland builds them both, it should know.

► **Simple Tooling**—Production planning for the Gnat has been done with a goal of making an output of 50 Gnats a month at Folland's complex of plants at the Southampton area within two years after an order is placed. Gnat big time—strong would be the lack of complex production tools and tooling required. Folland now employs about 1,600 production workers operating in 500,000 sq ft of manufacturing area and has an excellent reputation as a major subcontractor to de Havilland, Bristol, and Hawker.


It now is building Hunter tails Bristol Britannia nacelles, folding wings (which it also engineers) for the semi-battled Sea Vixen, rocket booster cradles for guided missiles and other missile components.

The learning curve on Gnat production is plotted from 31,500 man-hours for an initial quantity of 50 to 6,500 man-hours for 500 aircraft where it would level off.

► **Compliance**—With its small, lightweight airframe and careful engineering for simple production, the economics of the Gnat become interesting. It is being quoted currently at an \$55,000 price. This compares with about \$789,000 for the current standard RAF fighters now in production. Folland offers the following comparisons between the standard RAF fighter and the Gnat:

- **Cost.** Twenty Gnats fitted with engine, armament and full equipment can be built for the cost of one standard fighter.
- **Man hours.** Twenty-five Gnats can be built in the same number of man-hours

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5. HYTROL CONTROLS BAD RUNWAY CONDITIONS: ice, rain, dust, snow... all these bad weather "slip grenades" are controlled by Hytrol's anti-slip action.
6. HYTROL SAVES FUEL: cuts down excessive taxiing that inaccurately long landing runs.

The Tandem-Rotor BELL HSL-1 Helicopter

A Bell-designed rotorjet stabilizes this Robinson helicopter and lifts it to hover position for long periods of time while it remains maneuverable during ascent.



NORDEN Precision Reduction Gear Box

What is the performance of a Bell rotorjet?

When disengagement of maximum performance and maximum speed is a mandatory requirement, as in the case of a helicopter, a Nordén Precision Reduction Gear Box.

PERFORMANCE

Reduction ratios to 30:1000 have been attained without sacrificing performance. Friction is almost without remedy since the greatest reduction requires less than 64 in.-oz. of input torque. Acceptance tests of units were in production indicate loads of less than 0.55" at the output. All gearing for a gear box with a 35,000:1 reduction weighs only 8.5 ounces and is contained within an area 2-1/2" x 2-1/2" x 7-1/2" exclusive of mounting flange.

COMPONENTS

Materials used for gears and gears are dependent upon the respective requirements for each factor as average life expectancy, reduction ratio, operational speed, and torque. The same consideration of material is given in determining bearing materials and the size and type of precision construction ball bearings to be incorporated. Lubricants are selected for specific temperature range operation and maximum protection against corrosion. The case, stamped sheet metal or machined housing, are chosen for maximum durability, minimum weight and relative cost.

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LABORATORIES CORPORATION
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are low, shaded-type fighter aircraft. **•Paraglider.** The 30 Gladii built for the same cost as an standard fighter are being to last forty 10 min. combat against enemy bombers equipped with 74 cannon by the onset of five general fighters. This is particularly interesting since the top brass of the Ministry of Supply and Royal Air Force express their definite disinterest in the Gladii on the grounds that it "does not look" compared with standard fighters.

Because of the solid wall of official British disinterest in the Gladii project, Folland proceeded to build the Midge prototype to have a flexible article available to provide tangible proof of the Gladii principles, even though it had to use a 1,540 lb thrust engine to push its 4,000 lb gross weight.

The Midge prototype has under gone the wisdom of the decision to 11 days were its first flight last Aug 11, the Midge had flown 10 hr including three days of the RAF Research



F-100 Wing Work

F-100 Super Sabre wing attack fitting (lower photo) is depicted on special machine built by North America Aviation. Tool was previously gage custom specially made for the job by Swedlow Tool and Mfg. Co., New Haven, Conn. A cut 5 in. wide by 1 in. deep is reported possible with the custom wing dampers on the pit to reduce vibration. First rate of machine now is 45 in / min. Closing sheets steps in upper and lower fitting machine on other side of target press work unit side. The droppit fitting is cut tool from the root portion of the wing skin.



SWEDLOW Armor protects the pilot in the McDonnell F3H

The F3H Demon, carrier-based jet fighter being produced by the McDonnell Aircraft Co. of St. Louis, Mo., now embodies another feature that contributes to the safety of the pilot in combat.

The all-important human factor, the pilot, is now protected at the most vulnerable points of the cockpit by Swedlow Laminole XIG-112, approved under MIL Spec. A-17355 (Aer) Armor frogs, non-metallic—on the floor, on protection against blast—in the backrest, as protection from bullets—and as protection for the vital electronic controls. For information on this and other Swedlow laminole applications, contact the Swedlow plant nearest to you.

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Down test center when it made 18 flights in the hands of expert stress pilots, a remarkable demonstration of maneuverability.

►Flight Test-Squadron Leader E. A. Tinsley, Folland's chief test pilot, is posted on the first phase flight testing as follows:

"An outstanding feature of the aircraft is the good elevator control. At speeds from 90 knots to over 95 Miles, this control offers first-class response with stick forces never more than 6 lb./G. That is quite outstanding for a manual control and justifies the advice of small T/G ratios for helicopters and elevators to require control at high subsonic speeds. Over 4 G's has been pulled at these high speeds and Mach numbers, and no 'lag' of tendencies resulted. At the still, which is unusual, and recovery a straightforward and easy."

"Stability is just sufficiently positive throughout the G range to make the aircraft a fine ground attack machine. It is a very good gun platform with no violent vibration extended. As a fighter it is delightful to get back to a case of attack that gives a pilot a feeling of intimacy and seizes so often among these days. The heading gear width provides no trouble and even in a command it is easier to land than a Spitfire. Touchdown speed is 105 knots, but this seems higher because of the aircraft's small size. No landing was used at the Fairbrough air display simply to conserve the landing and time. This gave the impression that the Midge needed a long landing run."

►No Flaps-The Gnat design obviously had to compensate on some features to obtain its simplicity and performance. Among these are the lack of flaps, the substitution of a single chorded VHF struts for a complete 10-chorded struts and the pilot's seat adjustment which can be operated only on the ground.

However, the Gnat carries a surprising amount of equipment including a drop parachute, 10-chorded VHF radio, light-weight engine unit, IFF equipment, direction seeking equipment, and ejection seat and a pressurized cabin.

Folland reports it has received excellent cooperation from equipment makers in helping design weight out of components.

Employees' Children Win Scholarships

The first four full-tuition scholarship awards have been made to children of employees by Solar Aircraft Co. under its newly established scholarship fund. At the same time, Clarence Vogel, Air

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craft, Inc., has announced competitive tests for its two scholarship awards for 1954-1955.

• The **Solar** scholarships provide \$1,500 a year for four years for children of company employees who meet stated and set by a scholarship committee and who have plans for college study in engineering, business administration or one of the physical sciences having a direct industrial application. Past winners were Joseph Colanelli and Don Robert Bracha, of Solar San Diego, and Sharon McCauley and Jerry Lawrence Dull, of Solar-Dur Motors.

• The **Chance Vought** scholarships are open to sons of employees who intend to study engineering or an allied science at an accredited college or university following a standard four- or five-year course leading to a bachelor's degree. The awards provide full tuition and laboratory fees, plus an additional \$500 a year.

NACA Report

A Photographic Method for Determining Vertical Velocities of Aircraft Immediately Prior to Landing (TN 3098)—By Fennell Road, Langley Aeronautical Laboratory.

National Advisory Committee for Aeronautics has developed a different photographic method, using a 40-in. focal lens, for collecting statistical data on vertical landing velocities. No instrumented radiations is required at the subject, and there is no variation over with normal flight operations at the field.

Feasible maximum error for the system is stated as ± 0.31 ft/sec. The system is limited to conditions of at least 1,000 ft visibility with reflected light to produce photographic images. That report constitutes one phase of the NACA's continuing investigation of landing gear loads and drag criteria.



—Editor and Publisher



Nozzle for jet plane's air conditioner which keeps cockpit temperature down.

**RADIOGRAPHY
says:**

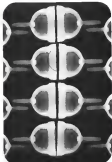
"O.K. to Machine"

COMPLEX MACHINING is required to transform this casting into the precision nozzle of a jet plane's air conditioner.

Fourteen intricate, curved vanes are cut in the rough casting's rim. Tolerance is .002 inch. This means plenty of high-cost machine time—which could be a total loss if it is left to the casting works to find any defect in the casting.

Radiography avoids that... shows up shrink or other faults before machining is begun. Only those castings proved sound are worked. Time and money both are saved.

Easy to see, isn't it, how radiography pays off? And if you would like to know other ways it can help you, like improving yield in production runs, here's a suggestion: Talk it over with your x-ray dealer. Or, if you like, drop us a note saying, "Send me a free copy of Radiography as a Foundry Tool."



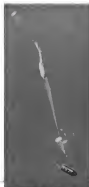
Radiograph shows castings with "shrink"—seams easily machining time.

EASTMAN KODAK COMPANY
X-ray Division
Rochester 4, N.Y.

Radiography . . .

another important example of Photography of Work.

Kodak



1. **JETTISON** after giving an almost additional boost on takeoff and climb, the de Havilland Super Sprite could rocket pays a



2. **PILOT CHUTE** that drops out the main parachute. Two smaller chutes stabilize the rocketable. DRI package as it enters the

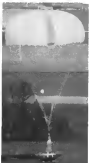


3. **DESCENT** with main chute fully open. Recovery falls at bottom of the descent can be pressing to inflate to cushion impact at

Britain's DH Super Sprite Cold Rocket Hits the Silk



SUPER SPRITE package developed by Britain's de Havilland Aircraft Co. is shown ready for installation, either as handcarried or jet-fighter for fast climb to interception altitude. The new cold rocket puts out 4,200 lb. of thrust for 20 seconds



4. **LANDING** Note shock absorber by the milled rubber rolls. Jetward package now can be recovered, refueled and reused.

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*"To you from today lands we draw the truth,
The cross is held in high;
If ye hold high with us who die
We shall go forth through vapors pure
In Freedom's field."*

And yet, when the parade is over and the last high note fades, it is so easy to "break faith" by being lulled into a sense of "nothing will happen here" . . . to let victory and freedom go by default.
"Hold high the torch"—but will we do it? We will if we respect the sacrifices of our soldiers, sailors and airmen through the great struggles in the past. Think it over in your mind . . . what they died for is worth defending now!



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AVIONICS

Radio Sextant Takes All-Weather Fixes

• Clouds and overcast do not blot out microwave radiation from sun, which this equipment depends on.

By Philip Klus

Coler Rapids, Iowa—A new navigation device—called the radio sextant—automatically takes accurate fixes on the sun, even through the overcast. Skidded for its first airborne evaluation soon in a Wright Air Development Center at Dayton, the device could find use in long-range navigation of guided missiles and aircraft.

The WADC radio sextant was developed here by Collins Radio Co. It is an adaptation of a shipboard model developed for the Navy Research. Radio sextant work at Coler, sponsored by the Navy, has until recently been under security wraps.

A large fixed-based radio sextant now operating near Coler Rapids is giving test fixes with maximum error of only 2.5 minutes of arc 95% of the time, with a probable error of one minute, according to Dr. David McCoy, project chief.

Neglecting other sources of error in an airborne radio sextant, this figure would correspond to a probable error of one nautical mile.

• **Hot Spot Radiation**—The radio sextant is able to track the sun's movement by virtue of solar radiation in the microwave region, produced by thermal agitation. Solar radiation was first detected in Britain and the U.S. during the war at a variety of microwave wavelengths. The fact could not be disclosed until late 1944 and early 1945 because of security.

Within a year after the disclosure, Collins began its research in radio astronomy, followed by an investigation of the feasibility of the radio sextant. The first operational model, for shipboard tests, operated on a 1.83 cm wavelength, selected because of low atmospheric absorption at this frequency. Collins is now experimenting with an 0.87-cm. radio sextant at its Peewee Ridge test station situated 10 miles northwest of Coler Rapids.

The station is located on the high crest of ground in the area to permit line-of-sight fixes to the horizon.

• **Radio Techniques Used**—At first glance, the radio sextant looks much like a tracking radar, with its parabolic



EXPERIMENTAL RADIO SEXTANT, under test by Collins Radio near Coler Rapids, is housed in a warehouse near sunset. Sextant tracks sun, even through overcast.



AIRBORNE RADIO SEXTANT, mounted on stabilized platform, could be used for long-range navigation of aircraft and missile. Photo shows components of airborne unit.

ant's manual and altitude angles cover 15 minutes, as established by the radio station, then comparing them with the star's theoretical position (as established by astronomical), to determine tracking errors. Based on 2,000 such readings to date, the station's probable error is one minute of arc.

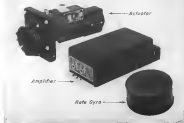
The Feather Ridge station is also being used to measure strong-line refraction of the solar signal when the sun is near the horizon.

► **Mossy Maple, Star Doubtful**—If the radio station is to be useful at night, another source of celestial radiation is needed. The station, whose temperature is only around 3,000° K (Kelvin) compared to 5,500°K for the sun, is a very much weaker radiator. However, recent Columbia experiments with the 5.67 cm arc band indicate that moon tracking may be feasible.

No Tubes, No Wires, No Spirals



MILITARY-TYPE CONSTRUCTION, employing magnetic amplifiers and potentiometers for high reliability, is used in several versions of Raytheon automatic missile control designed to permit unobstructed optics in lightplanes.



AGC-101 consists of an actuator, amplifier and rate gyro. First production units will be ready in November. Actuator weighs 10 lb. and sells for \$790.

Asked about the possibility of using "radio stars," McCoy explained that these radiations are extremely weak in the microwave region, with strongest radiations at wavelengths of 10 cm. and above. The weak distant antennas did cause 10 times larger first arc percent highly suspected for airborne use.

However, McCoy says that Cohen is closely following the work of radio astronomers to keep abreast of new finds in the field.

Douglas Buys New Alternator Test Stand

A new "freedback" test stand for electric alternators, which uses alternator output power to drive the machine under test instead of supplying it as a load bank, has been announced by

United Manufacturing Co., Hamden 14, Conn. Douglas Aircraft Co. has bought two of the stands, United says.

The new freedback test stand, developed under AF sponsorship, is a half ton in steel weight, lighter and less costly than the equipment it replaces, according to the manufacturer. The test stand comes in two models, one capable of handling alternators rated 50 kw. or less, the other for machines rated 125 kw. or less. The alternator under test can be operated at 150% rated load for five minutes, 200% load for five seconds at unity power factor, United reports.

► **How It Operates**—The alternator under test and a second alternator (operating as a synchronous motor) are mounted on dual output shafts of a variable-speed drive powered by an auxiliary motor, which makes up power losses within the two machines. The driving alternator (synchronous motor) must have an equal or larger rating than the machine under test, and should have similar, though not necessarily identical electrical characteristics, United says.

Loading the alternator under test is accomplished merely by passing a button switch the desired load is required. Power factor can be varied from 0.2 lag to 0.75 lead by means of a rheostat bank which controls field on the driving alternator. Use of the synchronous motor load instead of conventional load bank results in a slight change in waveform, precisely an increase in third harmonic.

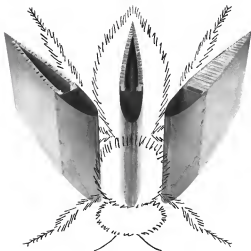
United reports that its new test stand can also be used to test conventional alternator drives, regulators and control panels, as well as for electrical systems check-outs.

New Mag Amplifier Has Gain of 50,000

A new 400-cycle magnetic amplifier, with power gain of approximately 50,000, suitable for with 2-phase 115-volt systems, is one of several recently manufactured components suitable for servo system use.

The new Model SMA 4103 mag amplifier is a half-ton, self-starting type with a response time of approximately 8 1/25 sec. Input impedance is 10,000 ohms, and the unit can be operated between temperatures of -55°C to 75°C. Manufacturer is Kollsman Corp., 535 Broadway, New York 12, N. Y.

Other new servo components include: • **Phase-sensitive magnetic demodulator**, Type 808, has a drift of less than 1% over an ambient temperature range of -55°C to 85°C, and can be operated up to 100°C with slightly higher drift, according to manufacturer. Unit can be



a honey of a story

Two exclusive Martin production developments—Metal Honeycomb and Structural Adhesive Bonding—now appear to be among the most important cost cutting innovations available to the aircraft industry.

Both are employed in production of the USAF B-61 Martin Bomber Remotely-Piloted Vehicle (RPV) now in production.

With Martin Honeycomb, a very section undergoing approval of 1,100 fabricated parts can be produced with as little as 80%.

With Martin Structural Bonding, the production time required for airframe laminations, such as skin and preparation—often amounting for as much as 90 percent of the total—may be cut as low as 25 percent.

It's a honey of a story, and there are many more under way on the way. That's why—You will hear more about Martin!

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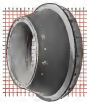


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operated at carrier frequencies of 50 to 5,000 cps. Manufacturer: Polytechnic Research & Development Co., Inc., 202 Wilbur St., Brooklyn 1, N. Y.



a control current of 65 ma. Also also covers an clutch brake models. Manufacturer: Magtrol, Inc., 513 S. Nagans St., Torrance, N. Y.

• Packaged servo systems, including amplifier, motor, and gear train, with automatic adjustments for adapting to a variety of load conditions. is available in 400- or 60-cycle models, priced at \$568 from Feedback Controls, Inc., 1112-54 No. Henry St., Alexandria, Va.

• Servo locking blocks, a complete line of precision electronic and mechanical servo system components for 60-cycle use, including servo and summing



amplifier, phase detector, gear boxes, gears, and cams, is available from Link Avionics, Inc., Binghamton, N. Y.

VHF Transceiver Sells Under \$200

Forces' VHF transceiver, selling for under \$200 including accessories, offers three crystal-controlled transmitting channels, continuous tuning reception between 168 and 176 mc.

The transceiver, which operates from a dry battery pack, can be used as standby equipment for lightplanes with existing VHF equipment, or it can be used as a replacement. Transceiver weighs 6 lb., battery pack weighs 1.75 lb. Manufacturer: a Spangier Aircraft Radio Co., Sky Harbor Airport, Indianapolis, Ind.



Reynolds' new PTFE coating improves speeds in bond films.

Simplified Wing Construction Keynotes Design of Newest Grumman Navy Fighter

Simplification is the key note of the PTFE Tiger design. The entire top and bottom skins of the wing are machined from single sheets of aluminum thus greatly reducing the number of parts, time and man hours usually involved in complex wing assembly.

Whenever aviation advances, Reynolds Aluminum advances with it. Every step in Reynolds' production is geared to the requirements of the constantly progressing aviation industry.

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Grumman's new PTFE Tiger design. The entire top and bottom skins of the wing are machined from single sheets of aluminum thus greatly reducing the number of parts, time and man hours usually involved in complex wing assembly.



Reynolds' new PTFE Tiger design. The entire top and bottom skins of the wing are machined from single sheets of aluminum thus greatly reducing the number of parts, time and man hours usually involved in complex wing assembly.

1000

• **Power From Thermocouples**—Thermocouples, previously able to supply only instrumental amounts of electrical

► U.S. Viscounts Use British ADF—First three of Capital Airlines' new Viscounts will use the new British Marconi AD 709C automatic direction finder, company reports. Selection of ADF for remaining Capital Viscounts will follow evaluation of first three Marconys. The British ADF reportedly uses Aries-type tubes.

MISSILE RESEARCH
MFG. CORP.
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HOW PROBE AND DROGUE SYSTEM could be used by jet tanker like Boeing B-70 for multiple refueling is shown in actual's refueling.

FRI Pushes Refueling Rig Production

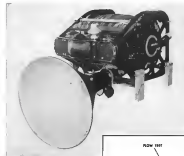
By George L. Christian

Baltimore—Flight Refueling, Inc., is gearing into full production of the A-12 probe and drogue refueling rigging system at its new plant here at Friendship International Airport, with a \$9 million backlog to keep it busy.

First production models will go to USAF, to be followed soon by units for the Navy (Aviation Week Jan. 26, 1973, p. 35, Nov. 1, 1974, p. 21).

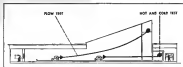
Current production models have a fuel flow of 200 gpm, but FRI is pushing an active development program to achieve higher flow rates, which would cut down armed refueling times and allow for greater operational efficiency.

Development work is also progressing in improving a line of fuel servicing equipment, including a new, light-weight pipe connector. Other auxiliary aircraft products developed by FRI in



A-12 PROBE AND DROGUE UNIT made by Flight Refueling is 500 lb. package containing tanker's complete refueling system.

WEI LAB is special building for operations tests of refueling equipment.



The Canada XPV-4's power plant is an Allison T40 turbo-prop engine, which costs \$8.5 million. It has ball bearings in 20 places.

Here, New Departure means positive handling of moving parts, precise shaft alignment and optimum shaft line control of engine.

BEARINGS for a "Pogo" Pilot

Vertical take-off? Tailfin landing? Fighter action? It's the Navy's newest—the Canada XPV-4 "pogo stick."

In its Allison T40 turbo-prop engine, some 20 New Departure ball bearings assure positive positioning of moving parts. And in the hub mechanism of the Curtiss-Wright Turboelectric propeller, New Departure carry heavy loads.

Throughout defense and industry, you'll find New Departure ball bearings ideal for countless applications. So whatever your bearing problem, talk with your New Departure engineer . . . now!

BEARING BEARS LIKE A BALL

NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE BALL BEARINGS ARE THE ONLY BEARINGS THAT CAN BE USED IN THE FOLLOWING APPLICATIONS:



STRATOFORTRESS STRATOFORTRESS-KS-47 (right) and B-47 on probe and drogue.



B-47 NESTLE UP to KS-47 tanker during 2,500 mi. Tokyo-Bangkok nonstop flight



IN NAVY TESTS, North American A5-B tanker which Grumman F9F Panther fit in.

a logical extension of investigating problems of high pressure fuel handling, include flow control, pressure relief and check valves, refueling valves and ground refueling nozzles and adapters.

• **Wing Lab—**Under facility at Flight Refueling's plant here is a "wet" lab—entirely isolated to simulate as early as possible all actual conditions that occur during flight while pumping fuel into and through line to drogue and probe

at "lines of hundreds of gallons per minute."

Purpose of the A5-B lab, sloping roof section of the building is to allow line and nozzles to be moved high enough so that hose and drogue may radiate in the same angles they assume under actual flight conditions.

• **Flying Safe—**Because of the hazards involved in such testing, performed with aviation fuels such as JP-4, flight

Refueling has taken elaborate precautions to eliminate all sources of possible danger and also has designed into the facility complete safeguards to personnel and property.

C. W. Newhall, FRU's president, told American Week of the careful safety planning that has gone into the facility.

• **Fuel storage tanks** are underground, to keep fuel safe from possible blast or fire.

• **Cooling system** keeps fuel that circulates in the test lab at temperatures well below its flash point.

• **Building** is constructed so sales and roof will blow out relatively easily, minimizing the destructive effects of a controlled explosion.

• **Test personnel** are protected from the lab proper by thick slabs of reinforced concrete into which have been set very thick, bullet-proof glass observation ports.

• **Floor of the building** slopes to drain spilled fuel into a long trough running lengthwise down the center of the test area, from which it is quickly disposed of.

• **Twice exhaust fans** at the end of the lab change the air in the building completely every two minutes (Air Force requirements are once every three minutes, says FRU).

• **Explosion-proof lights, switches and wiring** are used throughout the lab.

• **All fuel pumping and valving equipment** is remotely located outside of the test lab proper.

The entire lab, which occupies about 8,200 sq ft of floor space, has hot and cold chambers for testing equipment under widely varying temperature situations. The building contains laboratories to check and test materials and components under all environmental conditions, and an experimental shop.

• **Main Plant—**Two other, more conventional buildings on the 15-acre site (12 additional acres are available for further expansion) are the main plant and a "dry" lab.

The 50,000-sq-ft main plant houses the company's engineering, accounting, personnel, medical, cafeteria and circulation offices on one side and complete manufacturing facilities on the other, all under one roof. In the plant proper are a huge variety of machine tools, including turret lathes, heavy duty lathe, drill presses, grinding and milling machines and cutting and welding equipment.

Newhall points out that the new plant, which only recently got into full operation, "was designed from the ground up for the development of light refueling systems and special auxiliary devices used in aviation fuel systems."

The dry lab covers some 8,500 sq ft and houses equipment to provide such



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Eastern adds a New Constellation to the Skies !

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engine lubrication...this time,
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The newest member of Eastern's Great Silver Fleet has taken to the skies. The latest in Constellations, Eastern Air Lines' SUPER-C is designed to give Eastern passengers faster service with the same dependability proven over billions of passenger miles.

As with every airline, Eastern stresses reliable performance—brought about by dependable products. Proof of the aviation industry's confidence in Sinclair may be found in the fact that 43% of the aircraft oils used by major scheduled airlines in the U. S. are supplied by Sinclair. Why not place your confidence in Sinclair Aircraft Oil?

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DET 375-P-6

—for top speed in tight spots

Here is one of the most adaptable, time-saving wrench kits you can put in the hands of maintenance or production workers—a complete set of Snap-on's famed Ferret wrenches. The set includes all handles (3/4" square drive), adapters, extensions and sockets (3/4" to 1 1/2"), to speed a wide range of jobs. Handles are long, slim, strong, with patented "Palm-Grip" for real working comfort. 4-way socket grip for quickest handle hook-up. Available through your nearby Snap-on factory branch. Write for Snap-on Industrial catalog and general catalog of 4000 hand and bench tools.

SNAP-ON TOOLS CORPORATION

16240 N. 29th Avenue, Kenosha, Wisconsin
*Snap-on is the trademark of Snap-on Tools Corporation.



tools in atmospheric and vibration, plus a controls lab. Its purpose is to test all weight control components without fuel flow.

► **Ideal Location**—Originally located in Dadeville, Ga., Flight Rehearsal saw the necessity of moving to a location adjacent to a large airport in the latter part of 1953 when it received substantial orders of its probe and engine system from the Air Force.

The present site was chosen for a number of reasons. Among them: The company was able to obtain a sufficient amount of land located just off the end of the 9,450 ft. runway at the airport; and Baltimore presented a good supply of technical and shop manpower.

Newhall is pleased with the location and physical characteristics of Fleetwip International Airport. He points out that there are few houses in a radius of five miles of the airport, which practically eliminates noise and annoyance complaints. The approach are excellent, being built on a bank which is the highest land within 10 1/2 miles. The long runway (present is the 9,450 ft strip which took over 130's plan) is constructed in lake siltwork weighing up to 400,000 lb.

Newhall soon plans to build a tin strip connecting the long runway with the plant to make it possible to turn a trailer up to the plant's back door.



Traveling Furnace

New furnace-unit best-test facility at Boeing Airplane Co., Seattle, consists of traveling vertical cylindrical furnace mounted on tracks over recessed heating zone and flame 3,000-gal. quench tanks also recessed in floor. Furnition will accommodate parts up to 14 ft. long and 60 in. diameter. Traveling furnace, measuring 25 ft. high by 9 ft. in diameter and capable of 2,000° heat, is complemented by similar one 1,400° heat furnace also recessed in floor. Facility was designed and built by Westinghouse.



UNDER ONE ROOF

By James J. Haggerty, Jr.
(U.S. & Co. in series)

"When you watch these Georgians build airplanes you know why GAP-6 meets its schedules!"

Says James J. Haggerty, Jr., Aviation Staff Writer, Collier's



The first B-47 jet bomber built at Georgia Aircraft Plant No. 6 (GAP-6) at Marietta, Georgia, was flown 60 days ahead of schedule.

This is exciting because of the fact that GAP-6 was constructed by Lockheed less than four years ago. From a crew of 235 employees brought from Lockheed's Burbank, California, plant, a total work force of 14,800 has been developed, including more than 7,500 skilled workers.

These Georgia workers at GAP-6 have a spirit, a dedicated drive, a determination to do a good job.

unmatched in the aircraft industry. Plans built here today require 75% less man-hours than plans built here two years ago.

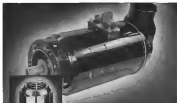
Take the enthusiastic team of Georgia aircraft workers and add it with GAP-6's overwhelming size (it's the biggest aircraft plant under one roof in the world) and you understand why Marietta is so important to the U. S. Air Force, which has engaged production of B-47's and C-130A assault transports to this strategic aircraft factory.

U.S. Air Force
Geot. Aircraft Plant No. 6

Lockheed
Aircraft Corporation
(in limited relationship)

Georgia
Dunwoody, Marietta

FASTENER PROBLEM



ESNA 23276
Accessory Mounting Nut

Safe, fast mounting of generators for aircraft engines

The 300 amp-d-c generator is manufactured by Jack & Bernis, Inc., Cleveland, for Boeing 707, Convair 440, Douglas C130 and Fairchild C119 aircraft. Its installation demonstrates how a new ESNA® nut-locking nut makes possible a faster, easier and safer method of mounting generators and similar accessories.

The new ESNA 23276 nut has been designed for use with a keyhole type mounting flange. It is simply inserted through the keyhole slot (Fig. 1) and tightened into the recessed mounting cavity. This cavity prevents the accessory from turning under stress, thus providing an extra safety factor (Fig. 2). An enlarged base diameter on the nut provides sufficient area to offset the mounting area lost due to the slot in the flange—which the nut must straddle without bending the flange. The ESNA "X" or beam type locking device (for operating temperatures up to 380° F.) is incorporated in the nut design.



Fig. 1



Fig. 2

Solve your fastener problem. ESNA ingenuity—and ESNA quality—will provide the most practical and effective solution.

MAIL COUPON FOR DESIGN INFORMATION

Dept. ME2-1123, ESNA Sales Dept., Corporation of America
2314 Woodhull Road, Union, New Jersey

Please send me the following fastener information:

- ☐ Details on 23276 ☐ Here is a drawing of my product
☐ ELASTIC STOP® nut holder. What self-locking features would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ State _____



PRODUCTION BRIEFING

►Chrysler-Essex Division of Miles Bernal Ford Co., is building a new test facility at West Hartford, Conn., costing about \$650,000, for research, developing and testing aircraft engine fuel system controls. The new building is to be finished in December.

►Kovach Plastics Corp., is getting up a plant on a 74-acre site in Hackensack, L. I., N. Y., with a big molding capacity of over 10 ft., 20 persons with capacity up to 18x12x5 ft., and other facilities.

►Federal Packaging Co. is a new, city area division of Fashion Fracks, Inc., Cincinnati, organized to make passenger and cargo crates as well as decoration chairs for aircraft and vehicle types for trucks. Fashion Fracks makes aircraft bulk containers, steel delivery containers, armored vans, several trucks and other area delivery products. The new division will have headquarters at 1441 Broadway, New York, most of its manufacturing will be done in Hamilton, Ohio.

►Standard Oil Co. (Ohio) will build a \$450,000 hangar at Cleveland-Hopkins Airport having 27,000 sq ft of area to house multi-engine business planes of Beech and other companies. The building structure is part of a \$3.5-million hangar development program projected at the airport.

►Perkin-Elmer Corp., Norwalk, Conn., maker of electro-optical instruments, telescopes, satellites lenses and special cameras has purchased control of a German optical and aircraft equipment



Ponderous Pod

Boys 4,500-lb. landing pod, recently made and used in one jump, is on its way to Boeing Airplane Co., Seattle, where it will be used to 4,500-lb. hydraulic jacks to shape parts under 1,100 psi pressure. The pod, measuring 175 ft. by 4 ft. 1 in. by 11 in., was made by U. S. Rubber Co.'s Mechanical Goods Division, Passaic, N. J.

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Cannon Plugs are the most reliable, most widely used fasteners in the world. They are made of high strength steel and are available in a wide range of sizes and configurations. They are used in a wide variety of applications, from automotive to aerospace. Cannon Plugs are available in a wide range of materials, including steel, aluminum, and titanium. They are also available in a wide range of finishes, including polished, painted, and anodized.

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MAGNESIUM

by **ALCOA**

Aircraft engineers are taking a second look at magnesium! Until recently, this metal was considered best for only minor castings—but sound technical advances have been made in alloying, treating and casting this modern metal.

Today, Alcoa operates three magnesium foundries at Vernon, California, Cleveland, Ohio, and Buffalo, New York. At Alcoa's Buffalo Works, magnesium castings weighing upwards of three hundred fifty pounds are being cast! An example is the forward section of America's newest, most powerful jet engine in production—Pratt & Whitney Aircraft's revolutionary J-57. This leading engine builder makes full use of magnesium's strength and lightness. Other applications, too, like gear housings on glass helicopters, are cast of Alcoa's Magnesium. But zinc alone does not make these castings unique. Alcoa's team of magnesium experts also turns out tiny castings which weigh but a few ounces. The difference is in the effort. From start to finish—from alloy selection to final inspection—these specialists watchdog every casting.

If you'd like more information on Alcoa's abilities . . . and facilities . . . pen call your nearby Alcoa sales office. The number is listed under "Aluminum" in the classified section of your telephone directory. Or write: ALUMINUM COMPANY OF AMERICA, 1800 L Alcoa Building, Pittsburgh 19, Pennsylvania.



Three-hub turbine wheels of Alcoa Magnesium—like the type used on the J-57 Pratt & Whitney turbine engine.



A challenge accepted by Alcoa—casting the magnesium around obstacles and blades to form a solid, complex casting.



Another intricate job, this one a light weight engine support for a Pratt & Whitney Aircraft turbine engine.

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NEW RADAR GIVES USAF POWERFUL EYES

Sees Storms, Obstacles up to 240 Miles Away

THE STORY BEHIND THE STORY

Unleashed at the National Aeronautics Show in September, the new Sperry APN-99 Radar developed for the Air Force meets the most exacting tests for the one above them: to see—and for good reason.

Armies have needed, and needed, truly versatile radar. To make navigable terrain accurate—to see it flying over obstacles,

unleashed terrain—to detect storms—to avoid collisions—to detect routes regardless of visibility. But—there has been a problem. Existing radars, no matter all of these functions, have required too much space and added too much weight.

Working with the Air Research and Development Command, Sperry engineers solved the problem by producing a new airborne radar that requires less space than a passenger, weighs less than 150 pounds,

And versatile? Despite its small size and weight, the new APN-99 Radar now gives users a selection of ranges from 3 to 240 miles—a choice of "looking" straight ahead, below or above—and permits concentration on any particular area of importance.

Developing the APN-99 Radar brought into play many of Sperry's specialized skills. Electronics—a field in which Sperry's development of the Klystron provided the heart of today's microwave radar. Gyroscopes—to insure "positive" stability in rough, turbulent air. And, of course, sound environmental based on Sperry's 40 years of experience in establishing standards for the aviation industry.

SPERRY HYDROSCOPE COMPANY

A DIVISION OF THE SPERRY CORPORATION, GREAT FALLS, N. Y.

3. Storm today passes within 100 miles of our radar scope

2. No obstacles directly ahead on radar at 100 miles

1. Storm storm cloud up to 240 miles away

testing facility. Its acquisition, Bofors America, is located at Ulsungpo/Boschman, near Lake Geneva. Built in 1949, it employs over 200 in a 14,000 sq. ft. facility.

A. V. Roe Canada, Ltd., Toronto, is building a new laboratory for the Gas Turbine Division to be completed this year at a cost of about \$400,000 for the structure alone. Structural, mechanical, fuel and engine divisions will be housed in the new facility. The company is ending a subcontract with Friggen Products of Canada, Ltd., Toronto, covering jet engine blades, which A.V.C. will now make itself. Change is made, it is understood, to cut production costs.

Continental-Wright Corp.'s Wright Aero Division office at Detroit has a new address: 4611 Woodward Ave., Detroit 1. Phone: Farmington 1-1289.

Willbush Corp., Pasadena, Calif., has established a service for testing and on-site packaging in compliance with recently issued policies of various branches of the Armed Forces.

Perle, Stone & Wilson Co., Southfield, Mich., is expanding its Machine Tool Division to make tools not heretofore produced. Another line of industrial equipment will be added. Plans to increase production of hardware and tool lines at Southfield are underway. Their operations will be transferred to Detroit. Surplus equipment of that division will be disposed of to make room for expansion at the machine department.



Extra-Wide Extrusion

Wider aluminum alloy extrusion now is tested at a 21-in. x 75 section of integrally stiffened ribs for increased stability of composite joints. Part was produced by Aluminum Co. of America on 14,000-ton press at Lafayette, Ind., works. Also can extrude V-section ribs (shown) for a 34-in. width.

AVIATION WEEK, November 8, 1982

Fastest Helicopter ... Turbine-powered by C.A.E.



SIKORSKY'S XH-39 is suitable for high performance—increased cruising speed, improved hovering ability, and faster rate of climb. Moreover, its simplicity of design, control and maintenance makes it unusually dependable. Although the engine, with all accessories, weighs less than 250 pounds, the ship accelerates up to 800 pounds of cargo. Payload a piece, in addition to pilot, is 81 cubic feet.



MODEL 300 C.A.E. with 81 cubic feet payload

Latest in steadily lengthening list of applications in which C. A. E. gas turbines are performing with distinction is this advanced helicopter, the Sikorsky XH-39. It is powered by the 450-h.p. C. A. E. Model 220 fixed shaft turbine, and holds the world's record for helicopter speed—154.000 m. p. h. A composite model developing 280 h. p. gives exceptional performance in the latest turbo-prop fixed-wing plane. . . . Two other C. A. E. turbine models—the M9 turbine and the TC-104 air generator—also are making good on important engine work. The former, powering the Cessna T-37 twin jet trainer and the Everts Q-2 Pacer light plane, has future promise, too, as auxiliary power for large planes. The latter is the nucleus of the MA-1 portable starter unit for large military jets, and is already in production at C. A. E.

LOOK AHEAD—TOWARD POWER



CONTINENTAL AVIATION & ENGINEERING CORPORATION

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**Douglas DC-7—America's newest
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— uses SPS Precision Fasteners**



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At North American you will use the nation's finest experimental and test facilities, subsonic, supersonic, and transonic wind tunnels, thermodynamic laboratory, electromechanical laboratories, rocket engine field laboratory. Many opportunities for recent graduates.

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Call or write the Home Office, Bedford, Ohio for full information on these Peacor products as applied to your specific installation:
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Journal of Management Inquiry 20(4) 409–424



BORG-WARNER CORPORATION
2400 NORTH WILSON ROAD • REEFERS, OHIO

The following contracts have been announced recently by Headquarters, Air Research and Development Command, Bolling AFB, Md.

LIFE-SPAN ESTIMATES for Medical Education and Research, Minneapolis, New Mexico research and service in the quantitative analysis of research data

QIAN HANG CHINMANSKY, *Statistical Population Culture*, Ohio, research and reports in the language of video procedures
\$4.95/100

UNIVERSITY of CHICAGO, Chicago, Ill.
 Formulation and reports on: Radiochemical,
 C.R. 44711, 105-514

UNIVERSITY of WILLOWDALE. Age-related
work, research and reports on "Dismal
Effects of Shaping Local Instruments"

UNIVERSITY OF MINNESOTA, Minneapolis 14, MN., research and reports on "A STORY OF THE EFFECTS OF HYPOXIC UPON TEMPERATURE CONTROL DURING EXPOSURE TO HIGH ENVIRONMENTAL TEMPERATURES, POWER AND STRESS." JOHN GILLIAM, 240-771.

The following contract awards of \$25,000 and more have been announced recently by the Bureau of Aeronautics, Department of the Navy, Washington 25, D. C.

BARBER AND WILSON CO., New
York branch address Brooklyn 174 44.

DELAPLAIN-FISCHER STEELWORK, Ready
Avalon Corp., Telephone N. J. 54911000

Journal of Polymer Science: Polymer Chemistry Edition, Vol. 31, 1993
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U.S. FOR Inc., Birmingham, conducts research, mfg., and delivers complete meteorological observing systems for shipboard use. 2 ea.

PRIMA E. MURPHY & SONS, INC., New
York, 400 W. 42nd St., New York 36, N. Y.

ELC SYSTEM DIVISION, Radio Corp. of America, Camden, N. J., Electrical engineer

FRANK D. KNEELAND, 100, New York, publisher and de-voting composer, is ill.

FRITCHIE, 1902, *Walkeana*, Miss., *nom.*
and *WALKE* *Indulgentia* and *sp.* *parva*, 118

Following is a list of recent USAF contracts announced by Air Materiel Command:

Allen-Chickens, 1845 E. Tenth Avenue
 Salt Lake City, Utah 84119
 Tel: 801-525-8800, 525-8801
 Corp. website: www.allenchickens.com

With Jack's brother, the handsome son, Bruno, back, Gold's master control is secure, and the old man is well on his way, it is, as the old man says, "a good day."

Marilena Electronics Manufacturing Corp.
TUCUMC, TEX. 74860 800/541-5411, 409/844-5411

Metacore, Inc., Chicago police precinct
211 W. 42nd St.
Metacore, Inc., Chicago police precinct

for additional information visit www.fishbase.org.

Donella Fredricka Welton; Donella Arla-
Dale Corp., 25405 Blvd 25, 240, 47009-4009.



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too far away
from this*
BELLOWS ENGINEER

when you need help on temperature or pressure control problems.

Ask for him!



(b) J. P. Cellier, et al. regressing (18),
 resulted in better model performance.

Mr. Cummings is one of several bellows application engineers ready to answer your questions in-drive or by teletype plan to consult and work with you on the design and application of custom-made bellows devices to meet your specific requirements.

Siphon and Bridgeport ballows resemble can be made from many metals—steel, brass, stainless, nickel and others. A wide variety of charging methods can be used to obtain the exact characteristics wanted in the control of any liquid or gas for whatever function it is required.

Bellows assemblies are used in many ways—thermoacoustic devices, expansion joints, seals, motion transmitters (flexible couplings), and as "muscles" for closing valves and performing other functions.

Our engineers, with a half century of experience behind them, are backed by simple production facilities. All our resources are at your disposal. For more information, write today.

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 Illustrated Bulletin No. VA-1400 tells you
 all about small business and follows across
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Robertshaw-Fulton
CONTROLS COMPANY

BRIDGEPORT THERMOSTAT DIVISION FULTON SULPHON DIVISION

How Much Lift In A Bootstrap?



In the competitive technical world of today, the answer is simply, "not enough." Ambition and ability are still far success factors but they must be supplemented with the "tools of the trade"—wind tunnels, electronic computing devices, physical test and research laboratories. These modern facilities are necessary to probe all fields of aerodynamics, helicopter, missile and propulsion development.

At McDonnell Aircraft, our new wind tunnel—support is the Mac wind—is just one part of a \$20 million facilities program to provide equipment and technicians with unlimited opportunities for professional growth advancement.

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OVERSEAS SPOTLIGHT

Rolls Makes India Study

NEW DELHI

Three British Rolls-Royce experts have submitted a report here on the possibility of setting up an aeronautical engine factory in north India. Several other European firms have been considered for plans and estimates, but it is understood that the Rolls report is the only one the government is considering.

The new plant would form a wing of the Hindustan Aircraft factory at Nasirpur, in Mysore State.

Copters to Span Water Gap

COPENHAGEN

Helicopter traffic between Copenhagen, Denmark, and Malmo, Sweden, will be opened June 1, 1955. Landing sites already are being prepared at seven towns. Copenhagen and at Malmo's railway ferry station. The 11-mile jump over the sound is scheduled for 15 min and will cost about \$5.

Plans for a similar service between Elsinore, Denmark, and Helsingborg, Sweden, are not underwriting for 1955, although a test service will be operated on the route during the International Architectural Exhibition in Helsingborg next summer.

Barrels to Fly Faster

STOCKHOLM

The Swedish air force has ordered construction of an undisclosed number of its J-35 Flying Barrel jet fighters. The new variant, to be known as the J-35F, will have a Swedish-developed afterburner to boost the thrust of its Swedish-built Ghost jet engine (Aviation Week Oct. 4, p. 7).

Designed by the Swedish Air Board and developed in cooperation with the Svenska Flygmotor Co., the afterburner is said to be the first successful device of its type developed for the Swedish-designed Ghost engine.

Plane Spare Parts Tax-Free

MANILA

Spare parts to be used in the repair of aircraft registered in the Philippines are exempt from the government's 17% exchange tax. Foreign exchange used for similar insurance and charter fees for Philippines-registered aircraft is also exempt.

Tax exemptions on cost, transportation or other charges incident to import of spare parts will apply since Civil Aeronautics Administration of the

"Gunner to Pilot...two fighters...turning in!"

No time to repeat this message. He must get every word right the first time.

In today's higher-speed, higher-altitude battles, crewmen must quickly grasp every code-word passed. Speed of intercommunication has to keep pace with speed of operation.

Working since 1945, RCA engineers have developed the AN/AIC-19—an intercom system which meets Air Force requirements for high intelligibility under conditions of extreme noise and obstacle. RCA noise-discriminating microphones have two items which "balance out" extraneous noise, transmit sounds only from the speaker's mouth. Vibration filter, amplifier and automatic volume control circuit reduce the effect of extraneous noise. Alkyd-compositing headsets maintain sea-level sensitivity at 40,000 feet or more—and give crew maximum head comfort.

Now in full production, the AN/AIC-19 is but one of many complete electronic systems RCA has developed for the Armed Forces. RCA equipment—from original planning to final production—assures greater efficiency, effectiveness and safety in operations.



300,000 Spent Weened Mps, woman volunteers for Ground Observer Corps to help the Air Force search for hostile aircraft, men Air Defense alert centers, do so on Air Defense alert jobs. 100,000 per week. Americans are now serving. Contact your local Air Force Office.



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We at A. W. Haydon take pride in our contribution toward bringing a mass of metal and machinery into integrated performance which meets Douglas' high standards. Integrated performance is born of a multitude of small component parts, working in perfect mechanical and electrical coordination. The A. W. Haydon precision timing instruments are a vital part of this vast network.



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- ✓ A. W. Haydon Repeat Cycle Timer is a vital part of the prop deicing equipment.
- ✓ A. W. Haydon D.C. Timing Motors are used in the cabin pressurization system.



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Design and Production of Aircraft Timing Systems

Philippine Airlines that the parts are essential to maintenance of covered aircraft.

Pastushin to the Islands

Potomac Aviation Corp., Los Angeles, has gained permission of the House Aeronautics Committee to set up a subsidiary at Honolulu International Airport.

The subsidiary, to be known as Hawaiian Aeronautics, Ltd., will be equipped to repair, maintain and modify converted aircraft engines and parts that previously had to be sent to the West Coast. Victor Pastushin, the company's president, and the firm may employ as many as 100 people. Initial investment will be \$100,000.



Smooth Sealing Ahead

Lightweight sealant gun developed at Douglas Aircraft now dispenses polyethylene plastic sealings, plugs and washers. The sealant is available in a wide variety of shapes, as the lower photo indicates. In addition, shapes may be changed by application of heat, and operator may be aided by drawing off seal. The tool is said to permit operator to work much more effectively in close quarters. Empty weight of gun is 27 oz., but it holds 1900 more solvent than conventional designs weighing twice as much, Douglas says. Responsible for development of the tool were A. J. Doherty and J. J. Methylak of the company's materials and process dept. Manufacturing and sales rights have been assigned to Senco Research Co., 212 W. Florence Ave., Eaglewood, Calif.



Meet two of the reasons why **TIMKEN®** forging steels give you uniform, high-quality forgings

TIME man on the left helps assure you of uniform composition in every Timken® steel forging bar. With this spectroviewer, he can tell the exact composition of a melt in just 40 seconds. Results are flashed back to the furnace so the molten cast maintains constant control of the heat analysis up to the moment of pouring.

The photomicrograph at right shows the uniform grain size after heat treatment is assured by spectroviewer or microscopic examination of every bar. The result—you can be sure the forgings made from Timken forging steels have uniformly high ductility and resistance to impact.

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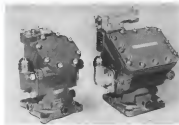


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EQUIPMENT



NEW VICKERS PUMP (3) for DC-7 and 707 is up to one-third smaller than old type (2)

Redesign Cuts Pump Weight, Size

By Edwin J. Ballan

Important savings in weight and size—two critical factors in the design of aircraft engine—characterize the new line of Vickers, Inc., variable-displacement pumps that are making their appearance actually on the new line of Boeing Stratoliner-Stratocruiser (707) prototype and the Douglas DC-7.

The Boeing 707 jet uses four of these Vickers pumps in its oil-fuel system (fueling gun, flap and brake). The DC-7 applies it to the extra supercharger drive on production models, with exhaust manifolds being made on planes that came off the line before the pump was available.

A thorough service testing on the Super Constellation is conducted in the "box" (see Lockheed) and on other. The pump is also reported to be specified for a number of new military planes and several prototypes.

► Evolutionary Design—The new pump is described by the designer's own terms as an "evolutionary" progression of its predecessor, rather than a brand new design. But it is widely apparent that there are some important differences in the new design that make it much more than just another new improved model.

These changes are responsible for the pump weighing up to 37% less and being as much as 35% smaller than the previous line.

The new Vickers units are designed for 3,000-psi operation and are avail-

able to meet bearing minimum clearance from 65 to 25 gals at 1,500 rpm. The smaller models can be operated at 9,100 rpm. Basic operating temperatures likely range from -65 to 160 F. Specially equipped models can be supplied to meet these operational limits.

In test to further requirements, completed in July, the lightest unit rated a 550-lb. load at speeds from 750 to 5,000 rpm, and 3,000 psi load, using up an substantially "new and" condition and showing no significant signs of wear, Vickers states.

Turning in external and external can be either right-hand or left-hand. Either unidirectional (single direction of oil flow) or non-center (capable of reversing oil flow) capability is available. Cylinder controls can be provided to meet unidirectional operation automatically while delivering varying flow, depending upon the system's requirements. An electric depressurizing control is available that will cause the pump to lock at maximum pressure and zero displacement while still leaving it prepared to meet instant demands rapidly.

Zero control arrangements are possible to allow control of hydraulic power in response to an electronic signal of a few milliamperes. Or a simple control system can be furnished which will respond to hydraulic control pressure in a direct applied in the external side from the Vickers hydraulic components. The bulk of aircraft units being supplied are said to have the auto under pressure control.

► Pump Weight, Size—Redesign of the previous Vickers pump yoke is the basic area of improvement. A switch from aluminum to steel is a major feature of this change.

Previously the yoke was a U-shaped structure and supported in the bearing by a pair of pins passing through its axis. It contained internal passages moving oil from where it entered the pump in the valve plate and cylinder block (other pressure was developed) and then returned oil under pressure to the pressure outlet port.

The redesigned yoke is an alloy steel casting with integral pinholes. This higher strength material permits making fluid passages walls thinner, cutting weight. Integrating pinholes and valve elements need for the inside yoke supports, cutting dimensions across the middle. Since the inside yoke supports are eliminated, two bearings are also unnecessary. The new yoke has smoother passages for the oil and eliminates structures inherent in the previous design.

The smaller yoke and streamlined elimination of separate pinholes permits a smaller housing for the pump. Weight of the housing is further reduced by use of a magnesium alloy casting, allowing high strength and great savings in weight density. This density minimizes leakage problems.

Another weight saving was made in redesigning the inlet and outlet nozzles without to embody chamfered castings having stainless steel threaded inserts. Military users require steel for all threaded connections.

► Operation—The new pumps are of A-10 configuration and are suitable for power stroke is determined by the angular relationship of the cylinder block and drive shaft axis. Angle is determined by position of the yoke, which in turn is set by the pump's control element.

Internal force of rotating parts is minimized by the new pin setup, eliminating the need for large bearings. Yoke pinholes are not subject to mechanical driving loads as hydraulic operating pressure. All working parts are continuously submerged in circulating oil.

► Hydraulic oil enters the pump through a flange-mounted fitting at the yoke pinhole. Passages in the yoke allow the fluid to flow to the valve plate which ports the oil into the cylinder while it is under pressure and passed back to the system. Two types of valve plates are under consideration: the more common flat type and the plate type. Vickers says it does not know at this time if the new pump will be standard in the new pump series inlet and outlet passages as the pump was identical.

Two bearings are available for per-

famous

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AMPHENOL's crack engineering team have completely redesigned the famous Blue RIBBON connectors and the results will be of interest to every company engaged in electronics.

The latest improvement has been the design of a new method of polarization. Instead of conventional guide pin and bushing polarization, male and female Blue RIBBON connectors are now mated by means of proper matching of the barrier heights between the contacts. Following this first important improvement AMPHENOL's engineers designed a complete line of front panel shells and cable-clamp latch-lock cans to fit the connectors—a step forward that makes the versatile Blue RIBBONS even more useful to the electronics industry.

What are the advantages of these design changes to you?

Barrier polarization allows increased contact spacing without extending the overall length of the connector—mounting is impossible. Front panel shells and latch-lock cans are available for Blue RIBBONS in a wide variety of locking arrangements, making possible the mounting of large numbers of connectors side by side without the possibility of connector misalignment by untrained personnel. Latch-lock types may be safety-locked and the cans are available with either end or side cable outlets.



Complete details on all AMPHENOL Blue RIBBON connectors in CATALOG #1

AMPHENOL

AMERICAN PHENOLIC CORPORATION • Chicago 30, Illinois

In Canada: AMPHENOL CANADA LIMITED, Toronto

President, Polytechnic Institute. Cannon men of both planes will be handled by Pan American at Roseville, Tex.

Lockheed Aircraft Corp. engineers have devised a time-saving, easy-to-service Super Connaix landing edge inspection panel and improved door latch which will allow disassembly of wing or empennage structure without need to jacking back the boom. This should save an appreciable number of man hours each time the operation is performed.

Clay Multiplier Corp.'s Aviation Div. will act as manufacturer's agent in the aircraft industry for Avcon Corp., Long Beach, Calif. Clay will handle domestic and export sales of Avcon's line of aircraft valves and assemblies for hydraulic, fuel and pneumatic applications. Clay's address: San Gabriel, Calif.

WHAT'S NEW

Telling the Market

"Answers to Real Hot Problems" is a 5-page brochure of technical data, charts and photos about vacuum coatings for high-temperature use. Write California Metal Coating Co., 6904 E. Sierrita Ave., Los Angeles 22, Calif. • Standard Record Mail Co., Box 166, Jenkintown, Pa., has issued a 32-page catalog, called *Unibook Standards*, describing in pictures and text the company's line of precision finished fasteners. • Detschler-Olsen Co. describes its paint spray booth line in a 3-page Bulletin 66. Address is 619 5th St. S. E., Minneapolis.

Nugen Machine & Tool Works has recently issued two bulletins describing its products. No. 66 introduces the company's straight-tooth, single-tooth, accurate-ground pinions (series SE-1, 2, 3). Bulletin 74-6 tells about Nugen's lathes and benders. Write to 613 Northland Ave., Buffalo, N. Y. • Aer data components and systems for aircraft and guided missiles are described in 24-page booklet put out by Air Research Manufacturing Co., Los Angeles 47, Calif. • Turco Products, Inc., has put out a 12-page book let telling how to dye prosthetics, Dy-Chek and Gelshek, help spot hidden fires in metal parts. Address: 6333 South Central Ave., Los Angeles 1, Calif.

Aircraft Photos Corp. is distributing reports of Boeing Document D-1260 and Military Specifications MIL-P-7784 which together describe types and problems associated with



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- Multiple circuit control?
- Sealing against environmental changes?
- Small size—with high electrical capacity?
- Switches for exposed locations?



Sealing against environmental changes?

MICRO SWITCH not only provides an extremely wide range of hermetically sealed switches but the MICRO SWITCH sealing process gives a true glass to metal and metal to metal seal. Perfect operation of these truly hermetically sealed MICRO SWITCH precision switches is assured under all environmental conditions. For long life and trouble-free operation be sure that the hermetically sealed switch is a MICRO SWITCH product.



Small size with high electrical capacity?

This MICRO SWITCH V2 switch has the highest electrical capacity of any switch of its size. Bell Aircraft engineers selected it as safety and warning switches on their H8L-1 tandem rotor helicopter. These switches are ideal for use as limit, control or safety switches in applications where space is limited. Engineering assistance is available at the nearest MICRO SWITCH branch office. It will cost you nothing—can save you time and money.



Let a MICRO SWITCH engineer help you select the right precision switch



Resistance to high temperature?

Today's jet engines produce extreme heat. Two of these MICRO SWITCH high temperature switches are located within a few inches of the 700° C temperature of the after burner on Chance Vought's Navy Cutlass F7U-3. Mounted at the rear lower end of the J-46 jet engine, they signal the opening and closing of the after burner cycle. This high temperature switch is an important MICRO SWITCH contribution to aircraft design. Whatever your switch requirement it will pay you to check first with MICRO SWITCH.



Multiple circuit control?

Efficient, lightweight and compact, this MICRO SWITCH toggle switch provides accurate multiple circuit control in Republic Aviation's F-84F Thunderstreak jet fighter. An assembly of 16 SPDT subminiature switches, operated by a single bat handle, gives control of as many as 32 circuits. This is one of hundreds of MICRO SWITCH toggle switches developed to meet the exacting requirements of aircraft engineers. For the switch to do a big job in a small space—consult with MICRO SWITCH.

Switches for exposed locations?



Here's a sealed switch assembly designed by MICRO SWITCH for use in exposed locations. This switch has long been a popular favorite with aircraft designers. Commercial airlines have it on the main landing gear assembly; Navy fighters use it as a landing gear uplock to signal when landing gear is retracted and locked. MICRO SWITCH engineers "grew up" with the aircraft industry. This is but one of hundreds of switches designed to supply the accurate reliability demanded of aircraft switches combined with small size and light weight. New switches are always being developed at MICRO SWITCH. What is your precision switch requirement?



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SMALLER PANEL (foreground) replaces seven battery units and is being B-47.

B-47 Refueling Panel Replaces 7

Boring Aircraft Co. is moving the Air Force and the taxpayer an estimated \$2.25 million with a new panel for controlling single-point refueling of B-47 Stratojets.

The old ground service personnel at AF bases will also be cost-conscious since the new universal panel can be used on any model of the B-47, regardless of which of several fuel systems are to be handled.

Boring Wichita engineers fixed this problem. Five different B-47 production models built then for incorporate three different fueling systems and there were two additional proposed changes due. Time has, each fueling system required that AF tanker trucks carry a separate panel to control the single-point "gassing up" for every type. With the new changes coming up, this meant that a

total of seven different panels would have to be available.

Aside from the stocking problem, the fact that each of the old design cost \$2,100 made it obvious that a new, universal panel that could handle any B-47 would provide real savings. The panel designed by Boring-Wichita costs only \$211 plus \$306 for modifying the airplane to accommodate it—a total of \$517. In addition, it is possible to take out 16 lb of electrical equipment from each bomber. The new universal panel is also much more compact than older models (see photo above).

Robert Flaxley, a service engineer at Boring-Wichita is credited with developing the universal ground service refueling panel. Production models are being built in quantity for the company by the Associated Co., Inc., Wichita.

Thermal Switch Tester Works on the Plane

On-the-plane functional tests of thermostats, switches, or with their interconnections on existing engines, cylinder head thermocouples and their covers, can be made using the portable Tempol Tester.

The Tempol tester probes generate and supply heat of a predetermined degree to the thermal switch or thermocouple by means of a voltage regulator, the specified temperature being read on a potentiometer. It takes about eight minutes to reach 300° temperature.

Accuracy to $\pm 5\%$ is guaranteed on temperatures from 0 to 300° F. The

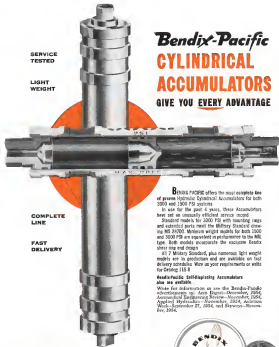
heater probes used for cylinder head thermocouples are guaranteed accurate to $\pm 4\%$ at 0 to 300° operating temperature.

B & H Instrument Co., Inc., P.O. Box 178, New York, N.Y.

Precision Mandrels Are Hand-Lapped

Guaranteed accuracy and consistency within .001 in., total indicator reading is claimed for new line of expanding mandrels, designated Type S Counter-Centric made by Le Count Tool Works.

Valid components of the mandrels are hand-lapped for high accuracy. They



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Standard models for 3000 PSI with mounting rings and extended parts meet the Military Standard drawing MS 24700. Minimum weight models for both 3000 and 1500 PSI are equivalent in performance to the MIL type. Both models incorporate the exclusive Bendix shear ring and design.

All 7 Military Standard, plus numerous light weight models are in production and are available on fast delivery schedules. Write us your requirements or write for Catalog 115-B.

Bendix-Pacific Self-Expanding Accumulators also are available.

Write for information or see the Bendix-Pacific advertisement in: Army Digest—December, 1954, Aeronautical Engineering Review—November, 1954, Applied Hydraulics—November, 1954, Aviation Week—September 27, 1954, and Shipways—November, 1954.

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Designed to meet USAF specification MIL-E-1272A, the device is operated on a 115-v. power circuit from a remote control station. Equipment includes: control panel, a support, shroud and temperature indicators and an air mover for uniform dispersal of the gas. Size is 3x3 ft.

American Research Corp., 31 Brook St., Bristol, Conn.



Lightplane Lease

Keep your rental machine on designed for flying down smaller places in unimproved areas. They weigh 15 lb., and mount of a 30-hp. engine and 7715 in. in diameter, with a 5-in. including cover plate and a 5-in. solid seat. To install, a small pipe is placed in the eye to serve as a cross handle and then the machine is secured into the ground. It can be recovered in a matter of seconds. The 30-hp. machine has a loading time of 750 to 1,000 lb. When a power surface is applied above the Kappitake, their loading capacity is multiplied. List price is \$2,000. J.L. B. Chance Co., 216 North Allen St., Omaha, Mo.

New flexible mount for P&WA's T-34 engine

... completely
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design



The Model 5180 MB mount will support and isolate Pratt and Whitney T-34 turboprop engine in the Boeing YC-92J Stearman and the Lockheed C-121F Super Constellation. MB mount components are also used in the Douglas C-124B. Design, development and testing of the new unit were made the sole and full responsibility of MB's vibration engineers. Engine and airplane manufacturers thereby reaped the full benefit of MB's specialized skills in this field.

Four of these Series 5180 Mounts are used per engine to isolate vibration. They're produced with the emphasis on performance and dependability in service — features for which MB Mounts have been justly famous for over 35 years.

Here is one more case showing the confidence that major manufacturers in commercial and military aircraft have in MB's ability to take over the full vibration control project and deliver results.

the **MB** manufacturing company, inc.

1060 State Street, New Haven, Conn.

HEADQUARTERS FOR PRODUCTS TO ISOLATE VIBRATION ... TO EXCITE IT ... TO MEASURE IT

Tiger Employees Rally to Save Cargo Line

- Workers agree to take 5% wage cuts to return FTL to airfreight business as individual operation.
- Prescott forecasts 'tough months ahead,' despite assurances that shippers will stick with airline.

By William J. Conklin

Berbank, Calif.—Flying Tiger Line last week won up 18 months of negotiations with Shick Airways, the provision and labor union by refusing to its former status as independent airfreight line.

The week-long merger with Shick was off, a proposed equipment leasing operation was off-and, company officials said ruefully, revenue was off.

► **5% Wage Cuts—Decisions to remain in the overnight business followed the declaration by Tiger employees that they were ready to take wage cuts if necessary to keep the nation's premier all-cargo airline operating.**

A number of shippers also urged FTL to remain in the air cargo business to keep it competitive, the company reported.

At a meeting with employees, FTL president Robert W. Prescott put the problem simply: Cargo must be brought within income. This he said could be done in two ways at once: by increased efficiency and by wage adjustments.

Flying Tiger now will file exhibits with CAA by Dec. 15, supporting its application for removal of its airfreight certificate and seeking additional authority to transport mail and express.

The airline also expects to file a petition to participate in the surface mail-bus rate, seeking authority to participate in the Post Office experiment. Shick denied it has petitioned to intervene.

Pilots, after personnel and aircraft source crews agreed to wage cuts that may average not at above 5%. Tiger officials were tilted to some of their shippers. The shippers would stick with them.

► **Reasonable Chance—After a meeting of the board of directors, Prescott issued this statement: "We will continue our prudent operation of our airfreight contract and charter and maintenance services."**

"We believe that the way out of the savings which employees have indicated they would be willing to effect will be sufficient to give the company a reasonable chance of success in the tough months ahead of us."

The merger with Shick had been

called off when the two companies found it impossible to reach a satisfactory solution to labor problems involved in the merger. FTL said a later proposal that would have converted the company into an equipment-leasing firm while Shick remained in the air freight business, also was derailed by labor provisions required in Civil Aeronautics Board (Aviation Week, Oct. 27, p. 106).

► **Quick Reaction—Unexpectedly, the two companies discredited, gave a lot faster than expected. Separate flights began last week.**

"It's a lot simpler to back up than it is to get together," commented one Tiger official.

There still were a great many problems to be solved, however.

The two overnight lines already had merged their terminal facilities across the nation. Now Tiger was not looking for one more in each city, as Chicago, Detroit and Boston, while Shick sought new facilities in San Francisco, Oakland,

Cleveland, Newark, Hartford and Philadelphia.

At the Burbank headquarters, Shick officers moved out of FTL headquarters and back to their old building.

Formerly, the accounting department of the two airlines had continued to operate independently while awaiting final settlement of the merger. Thus, the financial equations were not so complicated as it might have been.

There is, there still were some, differences to make. Tiger flights occasionally had moved on Shick airplanes and Shick cargo had flown on Tiger transports. Combination of new line schedules had been laid out on the other's timetable. Such funds probably would be divided in some pie-throwing company showdown.

► **Staggered Schedules—Whether the wage adjustment in the FTL company would be a staggered strike or 5% across the board had not yet been determined, a Tiger executive said. In fact, even the 5% figure was under negotiation, based on the belief that a overall 5% reduction in expenses was necessary to keep the company in the black.**

What might happen was that Eastern line rates might be cut more than 5%, low volume rates at all and intermediate rates 5% after a 5% average.

► **Streamlined Operations—FTL also set**



How TEMCO helps Boeing build B-47's

Thousands of man-hours of TEMCO's production skill are incorporated into the famous Boeing Stratofortress performing so seasonally around the globe today. For over three years, TEMCO has been delivering air fuselage sections to Boeing, Wichita. Proud to be associated with such an outstanding aircraft builder, TEMCO believes that such cooperation within the industry is a big factor in the Nation's defense potential.

Boeing is but one of the industry leaders relying upon TEMCO to help simplify production. Current customers also include fabrication of major components for Convair, Lockheed, McDonnell, and Republic. TEMCO earned these contracts because of its established reputation for delivering a quality product, on schedule, at one of the lowest costs in the industry.



Four fuselage sections for the B-47 Stratojet have been rolling from TEMCO's assembly line since 1950. On the oval head conveyor system (line shown above), final equipment items are installed in the components.



Defense Secretary Inspects Boeing 707

Secretary of Defense Charles E. Wilson, at the pilot's seat of Boeing Airplane Co.'s 707 jet transport prototype, receives a briefing from Boeing president William M. Allen (left). In the rightmost seat is Air Force Undersecretary James H. Douglas, Tag dangling from the roof between the

seats is a wingnut that the aircraft is not to be taxed or flown until the tag is removed by the portable inspection apparatus. Boeing has received a substantial USAF order for improved Model 717 version of the 707, designated KC-135 (Aviation Week Oct. 15, p. 14).

about streamlining its management organization, for example, each department is grouped geographically. There were some layoffs of technicians but a spokesman said this was due to expansion of an Air Force contract.

A new charter operation has been organized.

Flying Tiger, with 36 freight and contract aircraft, has expanded its contracts to full American fleet again on

U.S. Air Force Route No. 100, taking 44 cities from coast to coast.

When a newsmen asked jokingly what would be done with such movement of the aircraft as the limited route used in the numerous time periods ago to take a Tiger and a Shik aircraft together as a symbol of the merger, an FTL spokesman replied snily: "Perhaps we'll put them in a glass case in the hall where we'll be able to see them if we are ever tempted to merge again."

Strike Mediator Critical of AA

Neutral report blames American's handling of 5-hr. rule; spanks both sides for obstinacy in settling dispute.

Much of the ill will that culminated in the American Airlines pilot strike was caused by the company's "hooray landing" of the dispute prior to the time it became a strike move, according to David L. Cole, the mutually selected arbitrator.

In the full text of his interim report, Cole criticizes AA for postponing Civil Aeronautics Board for review of the 5-hr. rule on international DC-7 flights without any prior discussion on the issue with the pilots.

Cole says pilots believed this was a breach of their understanding with American, since it had been AA's practice to confer with the pilots on such matters. He notes that a mutual understanding resulted from statements made by the company's representative to the pilots' committee only to the dispute.

Friction, Unfriendly. On the other hand, Cole criticizes both the pilots and AA for the "hostile and unfriendly attitude" among them, the controversy. This "discouraged the parties from opening their minds sufficiently to offer or accept those concessions that the 5-hr. rule would not stand to other flights" until it was too late to be of value.

"For the same reason, the obstinate and defiant spirit pervaded the joint team coming to a veritable solution of the problem of realistic scheduling, a task which should be relatively easy when informed and intelligent people cooperate," he remarks.

"However, the pilots expected practically instantaneously to have technical and technical improvements could be made which might make the deviation from the eight-hour rule with pilot's character to be more realistic. In all the time which would lead to accomplish this."

"If this proceeding succeeds in settling the disagreement which has been built up, it will be agreed that the outcome to which the parties were well used, and more."

Continuity Method. The neutral

points out that "in keeping with the customary method of conciliation, even possible change in working conditions," American's director of flight reported Sept. 30, 1953, at a meeting of the Air Line Pilot Ass'n's executive council to discuss problems of the company DC-7 workload flight.

"He outlined the plan to try to make this aircraft meet its specifications and expressed the belief that after a reasonable trial and breakers period it would be able to do so," Cole says. "He stated that the company would not violate the law, and that if it was found that the workload flight could not cause within regulations it would be discontinued."

"The pilots understood him to say that if it could not be made within the prevailing 5-hr. flight limitation, it would be discontinued."

Protests, Confusion. Cole cites a bulletin from AA's director of flight to all DC-7 pilots and flight engineers on Mar. 5, "where the company had been operating the flights for more than three months and ALPA's protests and criticism of the operation were becoming more insistent and emphatic." He quotes the following facts from the bulletin:

"First of all, when I appeared before the M.E.C. to give this group the state of the company's DC-7 planning, I did not say 'the operation could be conducted within the flight time requirements.' Speaking for the company, I said:

"American Airlines is a responsible company and has not one who it intend to operate 'outside the law.'"

"Should it [AA] find that after a reasonable experiment is conducted that the company cannot operate within flight time limits (8) would discontinue nonstop operations."

"As of the present date, the company does not feel that it has had reasonable opportunity to demonstrate workload time in 8 hr."

The next thing the pilots knew, says

Cole, American had filed a formal notice with CAB. He notes that there is little now that can be done about this, other than to charge it up to "hooray landing" on the part of the company, and suggests "that it not must violate law and that the parties honestly meet each other that simple misunderstandings will be carefully guarded against in the future."

Direct Impact. In another section of his report, Cole says is critical of AA, saying: "For more than two airlines have avoided trying to make one another in terms of speed (advertising, etc.), and the industry is satisfied that this has been beneficial. The schedule has a direct impact, also, on the working conditions of pilots. The heavy component of pilot's living pay is based on scheduled or actual time, whatever is greater."

"The flight time limitations of the Civil Air Regulations, particularly the 5-hr. rule, are predicated on scheduled time. Obviously, then, scheduled block-to-block time is a real concern of the pilots, and the carrier must expect to be held to account for the validity of the schedules which it establishes."

"Indeed, the collective bargaining agreement in Section 9(A) explicitly gives the pilots the right to question scheduled time based on actual operation to be operated."

In line with the recommendations in Cole's report (Aviation Week Nov. 1, p. 56), both American and ALPA are cordially negotiating to iron out their basic differences. Cole had recommended that the company schedules be continued subject to conditions and restrictions to be worked out between the principal parties.

JAL to Trade U.S. Pilots for Japanese

Japan Air Lines' Japanese pilots, up to now flying as co-pilots, soon will move into the captain's seat on domestic routes. The last three are slated to make the switch next month.

All JAL chief pilots now are Americans, mostly from Transwestern Air Lines. Private plane call for Japanese captains on all routes by October 1957.

JAL officials say they expect to have the airline's entire domestic service operated by Japanese by November of next year. Replacement of the present staff of American pilots will cost the company approximately \$350,000 per year.

For overseas flights, JAL hopes to have Japanese captains as soon as possible. It plans to put five native co-pilots on the Honolulu route by the latter part of next year, converting them to chief pilots by late 1956.

The company currently has 75 pilots

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Nonsked Case

- CAB counsel proposes switch to air charter.
- Says irregulars for this field.

Establishment of a new class of airlines, "certificated charter carriers," is proposed by Civil Aeronautics Board's Bureau of Air Operations in a brief filed with executives in the regular carrier case.

The two main points which were made by the bureau's counsel, Melvin Bagan.

- Individual bidding of persons or property shipments by the airlines, making operating authority from the Board, should be banned. The said such service is not "additional and supplementary" but would parallel that provided by the presently certificated airlines, under to be economically feasible, it must be concentrated on high-density routes where the interested service on an individual basis has already been established.
- The struggle, with low overhead costs and without the obligation to provide service over a fixed route structure, is a "win-win" to pioneer and develop new scheduled charter services, a field which is presently empty and with at most scattered possibilities.

In domestic and overseas operations Bagan said, the all-charter operators should be given a free pass to develop both passenger and freight traffic. But in foreign transportation, he noted, awarded that their operations be limited to property shipments.

Regarding foreign operations, Bagan said, the all-charter operators should divert substantial traffic from the presently certificated international airlines, increasing the industry's employment. It also would have a "detracting effect" on bilateral air transport agreements.

Because international passengers are placed lines in advance and their cost is high, Bagan contended, there would be a big advantage for individual passengers to bond together in plane-load charter flights at cut rates.

Granting positive operating authority in the form of certificates (instead of exemption), the BAOB counsel also noted, would relieve all-wheel operators of "unfavorable consideration," which now have been extended with the term "unfavorable" and "unfavorable."

• Certificate Yano-Bagan suggested two classes of all-charter certificates, as follows: (1) interstate transportation of persons and property and (2) transportation of persons and property

overseas and of property only in foreign transportation.

- Other certificate terms he proposed:
 - Operation should be for five years. This would give the airlines a sufficient trial period and permit the Board to review its policies in the light of developments, he said.
 - There should be no limitations as to frequency and regularity.

Since the charter service would be limited to plane-load groups and property, movements between points, they would continue to develop the charter potential rather than divert traffic from presently certificated carriers. The public interest, Bagan said, an exclusive service would outweigh what little diversion, if any, that did occur.

- Airlines should not be limited to geographical areas.
- Since the certificated charter carrier is dependent upon the flexibility in its scope of operations and ability to pioneer new routes and types of traffic, Bagan said.

"Any new or geographical limitation would tend to restrict the carrier's flexibility and could force them to operate a route-type service."

- Criteria for determining a bona fide charter operation should be explicitly spelled out. American's route, he suggested that groups were in constant contact with the airlines for charter service and were not created simply to go ahead transport rates, he said. Charter carriers, the counsel added, should be based from airports where there are cities whose business is the formation of passenger groups from the general public or the sale of individual transportation services.

In reviewing all-charter certificates, Bagan urged the Board to give "considerable weight" to evidence showing as applicant has earned out charter as a commercial operation successfully in the past.

Since the transportation will be shared by charter operators to regularly on a divided seat and route-type services, he recommended that nationals that have presented no evidence of CAR membership in the past should be denied certificates.

Frontier Wins Raise

Airline Association Board has ordered a temporary and rate increase for Frontier Airlines, peaking \$39,553 additional pay annually.

The raise covers increased costs due to transportation of air service by Frontier in the Williston Basin area of North Dakota.

The new rate will boost Frontier's real pay to \$2,615,391 for the year ending Sept. 15, 1975, compared with \$2,675,760 under the former rate.

New Mail Pay Formula To Get Full Hearings

Full-fledged proceedings that could end for the first time will be required to establish new pay rates for the 15 domestic truck carriers, because of the strong opposition of United and Trans World Airlines to Civil Aeronautics Board's proposal to base rates on a more equitable cost index (Aerospace Week Oct. 11, p. 11).

Both airlines have filed objections with CAB to the plan and to its use as a temporary basis without hearings.

Under the plan, airlines had rates of \$9.10 cents a ton-mile plus 4.36 to 14.55 cents for each pound with higher fees. Higher fees paid for equipment at small airports.

Under the present 45 cents a ton-mile, United's yield under the proposal would drop to 38 cents and TWA's to 37.

Eastern Air Lines also has objected to the CAB proposal, despite the fact that its ton-mile yield would increase from 45 cents a ton-mile to more than 47 cents. Eastern maintains that its rate for 1973 should be 56 cents and, because of rising costs, should be more than that in subsequent years.

United Bids for SWA Local Service Routes

Local service routes should be taken over by non-scheduled airlines for the charter the government support now required for their operations, James E. Moore, assistant to the president of United Air Lines, recommended at a CAB committee's hearing on renewal of Southwest Airlines' certificate.

"United has expanded its willingness to serve Southwest's route in order to give CAB the opportunity, if it so desires, to solve the Honolulu subsidy problem along the lines recently recommended by the President's Air Coord. Policy Committee" by requiring the local service routes to various non-scheduled airlines.

Choosing UAL would save the government more than \$1 million annually now paid in subsidy to SWA, he added. "United feels that it is the obligation of the certificated carrier to provide service along their routes to the major communities where the CAB determines the public convenience and necessity require scheduled air transportation."

United is concentrating its flight for service on four California ports served by Southwest—Santa Barbara, Monterey, Eureka and Red Bluff. The Board approved UAL service to those points in 1972, in favor of Southwest.

CAB ORDERS

(Oct. 11)

ORDERED

Provision for Central Airlines to expand service temporarily at Shreveport, Okla., and at Fort, Tex. on September 3, and to serve routes at Fort and Fort Worth, Okla., but not to fly in excess of two one-way trips per day over segment 1.

Investigation of a special fee proposed by The American World Airways for travel on cargo aircraft from Jacksonville, Fla., to Seattle, Wash.

Classification of application of Western Air Lines to sell Route 5, D., as an intermediate point on Route No. 5, as application by the City of Santa Fe, N.M., for that service. Lines to increase in the passenger service to South Dakota from American Corporation, South America, Peru S.D., and Home charter of resources.

South American provision to expand service at Houston and Vancouver, Canada, Washington, D.C., and Miami, Bahamas, for extended period of time.

Classification of foreign carrier permit issued to Panair International Airways.

GRANTED

Provision for Flying Tiger Line to make a passenger charter flight from Los Angeles, Portland, to Baltimore, Md., carrying medical cargo.

Provision for North Central Airlines to continue providing service between Grand Forks, N.D., and Minneapolis, Minn., via Grand Forks, Minn., and St. Paul, Minn.

DEFERRED

Application by Gates' Airlines for approval to purchase a DC-3 from F. B. Bick (Aerospace Week Oct. 11, p. 11).

Application of Trans-Canada Airways for reduced passenger rate rates.

ORDERED

Exemption permitting Flying Tiger Line to provide free transportation from Miami, Fla., to Kingston, Jamaica, for St. High Falls, Jamaica, to permit them to observe the manner in which regulatory system are implemented.

Exemption permitting Piedmont Airlines to serve certain points in Kentucky and West Virginia.

Classification of temporary suspension of service by South America at Tokyo, Kan.

GRANTED

Provision for Transair, N. D., to increase its charter at Sacramento and the North Dakota, American Corporation, to increase the application of Northwest Airlines to suspend temporarily service at that rate.

Provision for the sale of South Dakota to increase in the application of Northwest Airlines to suspend temporarily service at Shreveport, S.D.

Provision for Western American Corporation to increase its application by Northwest Airlines to suspend temporarily service at Houston and Kalamazoo, Mich., and for California Field Board to increase in the Houston point.

Provision for Central Airlines to fly to its base in the South 196 route and to increase its service to Houston, Tex., but not to fly in excess of two one-way trips per day over segment 1.

DEFERRED

Provision for South America to modify certificate authority to South Air Lines.

DEFERRED

Complaint by Northern Consolidated Airlines against modification of policy and delivery charges proposed by Alaska Airlines.

Complaint by Northwest Airlines against a proposal by Pan American World Airways to operate scheduled service between Los Angeles and Seattle.

Proposal by National Airlines on day coach fare.

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• Southwest Airlines reports a new traffic record for September of 11,780 passengers flown, 1,550,000 passenger miles on average of 27% over September 1973. Passenger traffic for the first six months of 1974 averaged 12% over the same period of 1973.

• Trans World Airlines will carry 214 telephone company employees to Europe during October and November on a series of trips.

• United Air Lines is installing a new electro-mechanical device called United's new loading of passenger screens from the equipment it designed to give instantaneous information on seat availability to a user's terminal in station will be made in New York, Chicago, Los Angeles and San Francisco.

• Pan American World Airways has a new Island telephone center between Montevideo and Buenos Aires that has into the international network at New York.

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First Look Inside Capital's Viscous

Visits' completion of scheduled flight after Southwest's visit of Capital Airlines' long-range Viscount transport interior due passenger seats with tables that hinge out from seats should felt in top view. After pattern down how every baggage will be stored in built-in overhead bins. Capital's Viscounts will have passenger loading that saved of wings. Does will bring forward, angled seats, probably power-reclined, will provide extra safety. Foreign Viscounts load passengers through door behind the wing using a ramp. First three CAP Viscounts will also have TCA's door, remaining 17 will follow CAP type.





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News Sidelights

Experimental Formin Preen F.A. 49 delta single-seater is in the second stage of flight tests. Each harness landing bridle system comprising a mobile fin, most of which is in open to create drag.

Role of Ground Observer Corps volunteers in the U. S. in defense term is portrayed in a new 16-mm. color film, "My Junes, Next Year Perhaps," produced and released by Northrup Aircraft, Inc., Hawthorne, Calif. Feature is a simulated interception and destruction of an attacking "enemy" bomber by a Northrup F-80D Scorpion all-weather jet fighter.

Prototype installation of 12 fuel bidders instead of four integral tanks is being made on Firebas, Tite & Nather Co. Lockheed Locomotive by Tenneco Aircraft Corp., Greenville, Tex. The cells are interconnected to form four fuel units so that the existing fuel selector system can be retained.

In-flight experience on scheduled Slack service will be obtained by flight engineering students of Spartan School of Aeronautics as part of their qualification for Civil Aeronautics Administration certificate under an arrangement worked out by the scheduled freight airline and the Tulsa, Okla., school.

Lightplane: first used for prospecting uranium, continues to grow. Some 187 small aircraft are being used in the Colorado plateau area searching for radioactive ore.

Lucifer Fireplane 2 has undergone Army tests at Dugway Field, St. Helens, Va. The plane can fly as slow as 19 mph, take off and land in 100-ft areas. Finc is building a flying workshop of a production-type Fireplane, expected to fly in a few months.

Boeing WB-55s will replace World War II WB-29s at the workhorse of USAF Air Weather Service beginning next May. B-55s will be modified by Air Materiel Command to take weather observing equipment. Newer planes have 550 ma. motor magnets and higher cruise speeds. Cape Canaveral will have hot roasts aloft, cooked on the B-55's electric oven.



FLYING HIGH **FIND** is what Northwest Airlines calls Capt. Walter R. Bullock, 51, perched in a 1913 Curtiss Pusher replica that he built and flies in a hobby when he isn't piloting an NWA Boeing Stearman across the Pacific. Credited with 15,000 h of scheduled flight plus 4,000 h. private piloting, Bullock is believed to have more flying time to his credit than any other active commercial pilot, according to available records. NWA, Inc. has loaned to him a 1914

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Source: *Journal of the American Statistical Association*, 1997, 92, 1039-1054.

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Rails Must Not Retard Air

If the railroads cannot accommodate themselves to long-term economic trends and if government policies are deemed responsible in some extent, then the government should change those policies accordingly.

This is the recommendation of the scheduled air transport industry to President Eisenhower's Cabinet Committee on Transportation.

The solution to the railroad problem is not to be found by seeking to arrest technological progress or by attempting to impede the public's use of other forms of transportation," the Air Transport Act statement says. "We recommend that the Cabinet committee direct its attention to the underlying causes and long-run transportation and economic trends that have brought about the railroad problem rather than to the symptoms of that problem that have usually been analyzed in past studies."

For years the railroads have maintained that air transport lost ground mainly because it was inefficiently subsidized, to the disadvantage of the railroads which were then incapable of competing fairly. The rail line has instead the demand for lost air transportation.

The ATA then makes its point, we believe—that the primary problem of transportation concerns domestic airline transport, especially the railroads. It points out that the Air Coordinating Committee recently completed a thorough study of U. S. civil air policy, which already has been accepted by the President as a guide to solving aviation problems.

With reference to subsidies, ATA points out that in calendar 1951, 21% of air passenger miles involved subsidy and in carriers accounted for 33% of the industry combined as air and rail travel modes. In 1953, only 8% of domestic air passenger miles involved subsidized carrier, and the air share of the total first-class market was 65%.

On, put another way, in 1940 the airlines carried 13% of all first-class passenger-miles—railroad and air—and in 1953 they accounted for 65% of a much larger first-class passenger market. In 1940, the airlines carried just over 10 million annual first-class miles, while in 1953 they flew just under 73 million.

"These trends do not indicate that direct subsidies are financing diversion of traffic from railroads to airlines," ATA notes. It believes these trends would continue any way, and in the same degree. Extensive public stage of an transport "must be accepted as an economic fact of life" and in this Twentieth Century no business is free from the threat, or challenge, of technological change.

"Just as travel has moved from the railroads to fast-way airplanes, to the fast-moving airplane must undoubtedly yield in some measure to the helicopter. Transportation itself goes, in some instances, be replaced by improved methods of communication. The use of closed-circuit television on theater-size screens allows the conduct of sales promotion and training programs on a huge scale without actually transporting people from several locations to a company headquarters. It is

clear that as succeeding technological developments produce faster and more convenient transportation and communication media, the older modes must adjust their operations to meet these new conditions rather than seek to prevent their creation," ATA asserts.

Referring to the rail claim that airports used by airlines are "subsidized" by public authorities, ATA says no airport is a truly used public facility is exactly the same sense as a highway, and its support is drawn from many users, including the concessionaires on the airport. The railroads are only one of many parties supporting airports. Agreements between airlines and airport operators are reached by arm-length bargaining, just as in other private contract, and airport operators on rail airline industry financial statements, and vice versa."

ATA also takes up another railroad line of complaint—that the airlines do not pay for the federal airway system. "Again, this system is identical to public highways—open to users as a first-come-first-served basis, except for the military who command various priorities and operational prerogatives. Needless to say, these priorities work to the disadvantage of other users on many occasions," ATA reminds the committee.

This requirement for use of a public "way" is one of the inherent characteristics of the airline industry, just as operation over a private "way" is an inherent characteristic of the railroad industry. Both industries have their advantages and disadvantages. The private "way" costs more, but its use is controlled for maximum efficiency by the carrier. The public "way" costs the carrier less, but it has relatively little control over the aggregate use of the system and over the type and location of facilities installed."

The air transport industry already is paying full and fair, the railroad industry pay to state and federal governments for the cost of highways, to reimburse the federal government for its share of the cost of surveys operation, ATA says, and this is at a rate of about \$15 million a year—"our fair share of the survey cost."

The most important change in transportation since the last major legislation—the Transportation Act of 1940—is the tremendous increase in private transport "in all modes but rail." The motor car not only is the most powerful means of intercity passenger transport in the U. S., but in sheer of the total traffic "is steadily increasing," and advance of toll roads will accelerate this trend, ATA notes.

"The question that should be considered, then, is: What adjustments must be made in the operations of the common carriers to accommodate these trends, or, in contrast, these private carrier development and what changes in regulatory and promotional policies must be made to encourage common carriers to bring about the desired results?"

These are cogent words, and we trust that the committee, under the leadership of Sinclair Weeks, Secretary of Commerce, will give them the utmost consideration they deserve.

—Robert H. Wood

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